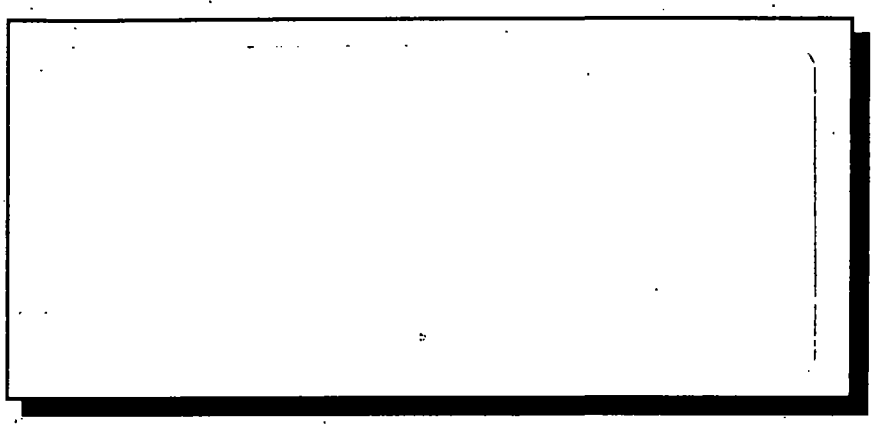

Versar INC.

Versar INC.

200 West 22nd Street, Suite 250, Lombard, IL 60148

FINAL REPORT
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

Docket No. VII-95-F-0008

Prepared for:

Pacific Activities Limited
626 Schmidt Road
Davenport, Iowa

Versar Job No. 2453-005

November 1996

This document has been prepared in accordance with accepted scientific and engineering practices and procedures and Versar, Inc.'s Quality Assurance Program.

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Date

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Division Manager, Environmental Assessment Group
Date

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APPENDICES

1.0 INTRODUCTION

This Final Report (FR) was developed to provide final closure of the Removal Action activities Pacific Activities Limited property located at 626 Schmidt Road in Davenport, Iowa (Site). The property location is presented in Figure 1 - Site Location Map (Appendix C). The industrial property contained lead, cadmium, and nickel in surface soil at levels that were of concern to the USEPA.

This FR is part of an Administrative Order on Consent between United States Environmental Protection Agency (USEPA) Region 7 and Pacific Activities, Limited (P.A.L.). The FR presents the summary of closure activities; final closure costs; quantities of material managed; destination of hazardous material removed from site; analytical results collected during closure activities; relevant documentation generated during removal action; and a Post-Closure Inspection and Maintenance Plan for final closure of the environmental issues.

The Administrative Order on Consent between USEPA Region 7 and P.A.L. was issued on June 6, 1995 with actual closure activities as outlined in the consent order starting immediately thereafter. Project progress occurred as follows:

- Administrative Order on Consent between United States Environmental Protection Agency (USEPA) Region 7 and Pacific Activities, Limited (P.A.L.) - June 6, 1995
- Grid Sampling, analysis, and reporting - June through October 1995
- Treatability Study - August 1995 though April 1996
- Removal Action - June through August 1996
- Install Monitoring Wells - September 5, 1996
- Submit Final Closure Plan - October 25, 1996

2.0 ADMINISTRATIVE ORDER ON CONSENT AND REMOVAL ACTION WORKPLAN

2.1 Administrative Order on Consent

The USEPA issued an Administrative Order on Consent (Consent Order) pursuant to Section 106(a) of the Comprehensive Environmental Response Compensation and Liability Act, as amended, 42 U.S.C. § 9606(a) on June 6, 1996. P.A.L., an Illinois Corporation, was named as the only respondent required to perform a time-critical removal action at the site designed to protect public health and welfare and reduce or eliminate any hazard posed to public health by the exposure to workers and others on or near the site to dust inhalation and ingestion of hazardous substances present in the site soil. The Consent Order is included as Appendix A.

2.2 Removal Action Workplan

The Removal Action Workplan (RAW) was developed to provide final closure of the P.A.L. site. The RAW presented the technical approach and planned execution for final closure activities to be performed at the site.

The RAW was issued as an attachment to the Consent Order. A copy of the RAW as an attachment to the Consent Order is included with Appendix A to this report.

The RAW included within the scope of work that the property be re-sampled in order to determine the areas with elevated lead, cadmium, and nickel. With the completion of property-wide grid sampling and analysis of surficial soil, it was determined that approximately one third of the property area of exposed soil required stabilization by soil-cement, one third of the property area required a fabric and gravel cover, and one third of the property required no further action. Based on the sporadic distribution of grids with soil requiring stabilization by soil-cement, the decision was made to excavate that soil and consolidate the stabilized mass into an above-ground berm along the northeast border of the property. The berm of stabilized soil-cement deviated from the original RAW that had planned to stabilize the soil in-place.

3.0 SOIL/CEMENT STABILIZATION AND RELATED ACTIVITIES

Versar, Inc. contracted Envirocon, Inc. of Missoula, Montana to provide soil/cement stabilization services at the P.A.L. site. On-site closure activities started on June 19 and finished on August 9, 1996. During the course of the project, Versar prepared weekly progress reports to the USEPA. The progress reports are included in Appendix B. Procedures and results of the stabilization activities are provided in the following sections.

In the project work plan, the site was divided into 50- by 50-foot grids. The grids were identified with an alpha-numeric grid system. The grid originated at 25 feet south and east of the northwest property corner. Letter designations were located along the western most property line increasing to the south and the numeric designations located along the north property line increasing in a easterly direction.

Based on analytical testing the site grids were assigned into one of three separate groupings: Soil/Cement, Soil Cover and No Further Action Grids. Grids were assigned a grouping based upon analytical results for the target metals (cadmium, lead and nickel) compared to Initial, TCLP and Final Action Levels. Each grid within the Soil/Cement and Soil Cover Groupings was identified numerically. Grid identification numbers are shown on Figure 2 - Final Soil/Cement Grid Plan and on Figure 3 - Final Soil Cover Grid Plan in Appendix C. The grid groupings were selected based on the decision tree, provided in Figure 4.

Further discussions with regard to the Soil/Cement and Soil Cover Grids are provided in the following sections. With the exception of certain No Further Action Grids located adjacent to areas where casing fragments were excavated, remedial activities were not performed in the No Further Action grid areas and discussion has not been prepared for these areas. . Further discussion regarding areas where excavation extended into a No Further Action Grid is provided Section 3.2.

The Removal Action activities included: site preparation, excavation and backfill of Soil/Cement Grids, geotextile and crushed stone cover on Cover Soil Grids, processing and stabilization of soil containing elevated levels of target metals, and berm construction. Other construction activities were completed during the project that were not related to removal of contaminated soil. These activities included: construction of utility trenches, site grading and drainage, installation of storm sewers and ditches, and disposal of construction debris.

A summary of quantities excavated, treated and/or disposed of are provided in Table 1 - Final Removal Action Quantities.

Table 1 - Final Removal Action Quantities

Soil Excavation	5,730.9 Cubic Yards
Soil/Cement Stabilization	7,039.6 Tons
Site Backfill	9,108.8 Tons
Geotextile Installation	15,500 Square Yards
Berm Cover and Drainage Layer	2,181.8 Tons
Chain Link Fence Installation	690 Lineal Feet
Seeding and Mulching	4,784 Square Yards
Construction Debris Disposal	238.7 Tons
Drainage Pipe Installation	320 Lineal Feet
Drainage Ditch Installation	380 Lineal Feet

3.1 Site Preparation

Initial site preparation activities included establishing site security, conducting a site elevation survey, monitoring background perimeter dust and constructing the decontamination area. After the initial activities were completed, the site was cleared and grubbed.

Site preparation also included segregating surface debris from various soil/debris piles located around the site. After segregation, soil from debris piles was stockpiled on the former melt shop pad. The debris, classified as construction debris, was stockpiled on a concrete pad between Buildings 17 and 19. Construction debris included debris with a nominal size greater than six inches.

Approximately 1,000 cubic yards of soil containing elevated metals and 500 cubic yards of construction debris were segregated from the soil/debris piles, prior to excavation of the soil/cement grids.

Soil from three piles located north of Buildings 17 and 18 had been previously tested with results indicating that the target metals were below the soil/cement stabilization cleanup objectives. Soil from these piles was transported to the berm area and used to prepare the berm subgrade.

The berm pad area was initially uneven and not suitable for construction of the berm. Preparation included removing debris, foundations and vegetation; leveling the berm pad to a relatively flat grade; compacting the berm subgrade; and excavating ditches located between the berm and property fences. Soil excavated from the ditches was incorporated into the berm pad. Soil/cement grids which were located in the berm pad were excavated prior to leveling the foundation for the berm pad.

3.2 Soil/Cement Grid and Plastic Casing Fragment Excavation

Envirocon started excavation of the soil/cement grids on June 27 and finished on July 9. To insure that the grids were excavated to a minimum depth of 12-inches and that plastic casing fragments were removed, Versar monitored the excavation of each grid. During excavation, the sidewalls of each grid excavation were measured so that the minimum excavation depths were achieved. In some cases, the final excavation depth was less than 12 inches, because during excavation permanent structures (i.e. sidewalks, pavement, utility conduits) were encountered. Excavation of the soil/cement grids resulted in 5,730.9 cubic yards of soil, plastic casing fragments and debris with a nominal size of less than six inches. The excavated material was stockpiled on the Melt Shop Pad. Soil quantities excavated from each grid are provided in Table 2 - Soil/Cement Grid Excavation Quantities.

Table 2 - Soil/Cement Excavation Quantities

Grid #	Location	Cubic Yards	Grid #	Location	Cubic Yards	Grid #	Location	Cubic Yards
1	K,1	67.59	21	B,11	56.30	41	N,8	136.11
2	J-1	70.93	22	C,8	17.85	42	N,7	230.56
3	I,1	88.70	23	C,9	84.81	43	N,6	220.56
4	F,1	116.11	24	C,10	86.67	44	M,7	225.74
5	E,1	131.42	25	C,11	102.22	45	M,6	152.04
6	D-E,0.5	99.25	26	C,12	12.50	46	L,7	256.76
7	B,0.5	64.84	27	D,8	26.69	47	L,6	106.67
8	AA,1	73.03	28	D,9	84.44	48	K,7	177.16
9	AA,2	49.97	29	D,10	73.33	49	K,6	83.29
10	AA,3	50.37	30	D,11	211.67	50	L,5	49.19
11	AA,4	52.76	31	D,12	265.27	51	K,5	53.70
12	AA,5	50.09	32	D,13	47.22	52	J,5	147.07
13	AA,6	42.35	33	E,10	71.11	53	I,6	55.00
14	AA,7	32.08	34	E,12	210.22	54	H,6	74.44
15	AA,8	28.24	35	F,12	26.12	55	J,4	149.96
16	AA,9	53.70	36	F,13	102.96	56	J,3	70.93
17	A,9	58.64	37	G,12	42.59	57	L,4	28.33
18	A,10	76.23	38	I,12	74.07	58	L,3	105.69
19	B,9	76.48	39	O,7-8	192.82	59	L,2	52.78
20	B,10	52.22	40	O,6	231.11	Total Excavation		5,730.9

Soil/cement grids were excavated with either a tracked-excavator or by bulldozer. Soil destined for stabilization was hauled to the stockpile area on the Melt Shop Pad by loading the soil into dump trucks or by tramming the soil to the stockpile with the rubber-tired front-end loader.

Plastic casing fragments were excavated from two areas located adjacent to Building 41. The maximum excavation depth of the fragment area east of Building 41 was 3½ feet below a grade equal to the floor slab subgrade elevation in Building 41. The area west of Building 41 was excavated to a depth of approximately 1½ feet below the Building 41 floor slab subgrade elevation. The casing fragments were hauled from the excavation area to the soil stockpile located on the Melt Shop pad. The location of the plastic casing fragment excavations are also shown on Figure 2 - Final Soil/Cement Grid Plan.

Plastic casing fragment excavations extended into 'No Further Action' Grids which were located adjacent to these fragment areas in order to remove additional casing fragments. Visual inspection was used to determine the final limits of these excavations.

After the soil/cement grid excavations were completed excavations were backfilled with an Iowa Department of Transportation Gradation No. 11 crushed stone. The stone was compacted to a minimum of 95 percent of the standard proctor dry density of 136 pounds per square foot (psf) and optimum moisture content of 8.6 percent. Compaction test sheets are provided in Appendix D.

3.3 Soil Cover Grid Backfill Summary

The Soil Cover Grids were prepared during the site preparation phase of the project. Preparation of Soil Cover Grids included mowing of grass and weeds, leveling, removal of stumps and miscellaneous debris. The grids were then covered with a 4-mil non-woven geotextile fabric and a six-inch thick layer of Iowa Department of Transportation No. 11 crushed stone. The stone was compacted to a minimum of 95 percent of the standard proctor dry density of 136 pounds pre square foot psf and optimum moisture content of 8.6 percent. Compaction test sheets are provided in Appendix D.

Soil Cover Grids located within the berm foot print were not covered with geotextile and crushed stone. These grids were covered by the berm mass. Locations of the Cover Soil Grid are shown on Figure 3 - Final Cover Soil Grid Plan in Appendix C.

3.4 Soil/Cement Stabilization and Berm Construction

The soil/cement stabilization process started immediately after the final soil/cement grid was excavated. The soil/cement stabilization process included the following steps: 1) soil screening, 2) placement of soil layers onto the berm, 3) addition and mixing of reagents, and 4) compaction of soil layers. The completed berm required placement of the drainage layer system.

3.4.1 Soil/Cement Stabilization

Soil excavated from the soil/cement grids was processed to remove non-soil debris from the soil to be stabilized. Debris with a nominal size greater than six-inches was determined to be construction debris and was added to the construction debris pile located between Buildings 17 and 19. Additional, oversized debris, with a nominal size of less than six inches and greater than two inches, was stockpiled on the Melt Shop Pad for crushing and/or inclusion into the stabilized berm. The processed soil was also stockpiled on the Melt Shop Pad prior to being stabilized. Approximately 400 cubic yards of additional, oversized debris consisting mostly of bricks and steel pieces (rebar, pipe, posts, carbon electrodes) was processed out of the soil excavated from the soil/cement grids.

The processed soil was hauled from the stockpile to the berm area via tare-weighted dump trucks. Each load of soil was weighed prior to being placed into the berm. The weight of each load minus the tare weight of the truck was summed for each berm lift. The weight of each lift was then used to calculate the amount of reagent (2% sodium bentonite and 9% Type I portland cement) to be added to each lift.

Prior to adding reagent, each lift was back dragged with a low-ground-pressure bulldozer and measured to assure uniformity in the lift and to shape the lift prior to mixing. The lift thickness was then checked and recorded. Processed soil was placed in either 6 or 12-inch loose lifts. The total amount of soil stabilized in the berm was 7,039.6 tons.

Once the amount of reagent was determined, the reagents were placed onto each berm lift by using a spreader truck which was also tare weighted. The spreader truck used a vane feeder to place the reagents as the truck worked each lift at a constant rate of speed. The berm areas were further divided into smaller sections to assure the proper amount of reagent was added to each lift. The lift weight and amount of reagent added to each lift is provided in Table 3 - Reagent Calculation Work Sheet.

Table 3 - Reagent Calculation Work Sheet					
Lift #	Lift Weight (ton)	Bentonite Rqd. (lbs)	Cement Rqd (ton)	Bentonite Added (lbs)	Cement Added (ton)
1	1,193.00	47,720	107.37	48,155	107.29
2A	581.86	23,270	52.37	23,209	52.86
2B	572.31	22,892	51.51	22,339	53.63
2C	471.17	18,846	42.41	18,464	44.48
3A	386.95	15,478	34.83	15,150	34.50
3B	503.48	20,139	45.31	18,950	45.00
3C	284.94	11,397	25.64	10,227	25.15
4A	373.80	14,952	33.64	15,000	33.46
4B	397.62	15,904	35.79	16,024	36.00
4C	304.43	12,177	27.40	12,000	27.40
5A	300.29	12,011	27.03	12,052	27.00
5B	313.33	12,533	28.20	12,025	27.18
6	863.44	34,537	77.71	36,116	78.77
7	493.04	19,721	44.37	20,128	44.26

3.4.2 Soil/Cement Compaction

After spreading the reagent, the soil and reagent mixture was combined with a road reclaimer/soil stabilizer. Moisture content determinations of the soil/reagent mixture were determined after the initial mixing. The amount of water required to achieve optimum moisture content was determined then added to each lift with a spray bar mounted on the back of a water truck.

After adding water, the soil, water and reagent was blended again with the road reclaimer/soil stabilizer. The moisture content of the blended mixture was again determined. If optimum moisture was not achieved, additional water was added to the lift. When optimum moisture was achieved, the soil/cement was then back dragged with a low-ground-pressure bulldozer to assure uniformity in the lift and to shape the lift prior to compaction. A vibratory roller was used to compact the soil/cement mix.

During compaction of the first lift, a rolling pattern curve was prepared to determine the number of passes required to attain compaction to 98 percent of the maximum density and at what point the soil/cement starts to break apart during compaction. The rolling pattern curve is provided in Appendix D - Berm Compaction Results.

The soil/cement was compacted to a minimum of 98 percent of the maximum dry density as determined by the one-point proctor method for each lift. One-point densities ranged from 105 pcf to 120 pcf which were higher than the specified dry density of 104.7 pcf provided in the treatability study. Compaction testing results for each lift are provided in Appendix D - Berm Compaction Results.

The berm was constructed at a location parallel to the eastern property fence, turning in a northerly direction to parallel the northern property fence for a short distance, see Figure 5 - Final Berm Construction. The final berm has a basal area 75 feet wide and 512 feet long. The berm was constructed with a 4:1 (horizontal to vertical) side slopes with constructed height betweeen seven and eight feet.

After the final soil/cement lift was compacted in place, the drainage layer was constructed atop the berm. The drainage layer consisted of a compacted six-inch lift of sand covered with a 4-mil nonwoven geotextile and six inches of topsoil. Compaction results for the drainage layer are provided in Appendix D - Berm Compaction Results. The berm was then hydro-seeded and surrounded with a security fence to prevent unauthorized.

3.5 Debris

3.5.1 Construction Debris

Construction debris, nominal size greater than six inches, collected during site preparation and excavation of soil/cement grids was stockpiled on a concrete pad located between Buildings 17 and 19. Construction debris consisted of approximately two-thirds concrete and one-third steel, wood, and miscellaneous debris. Concrete and wood was transported to the Scott County Landfill as general construction debris. The steel was hauled to the Alter Trading Scrap Yard for recycling.

3.5.2 Oversized Debris

Oversized debris, nominal size between two and six inches, collected during screening of the excavated soil was incorporated into the berm. Approximately 400 cubic yards of oversized debris consisting mostly of bricks and steel pieces (rebar, pipe, posts, carbon electrodes), was processed out of the soil to be stabilized. A screening plant equipped with both two- and six-inch screens and hammer mill was used to screen the oversized debris and soil clumps. Due to the relatively small volume of oversized debris screened out of the soil excavated from the soil/cement grids, the oversized debris was mixed back into the soil and stabilized during the berm construction process. The oversized debris was incorporated into 12-inch lifts in the center of the berm.

4.0 HEALTH AND SAFETY OPERATIONS

4.1 Health and Safety Plan (HASP)

A HASP was established to provide guidelines for safe procedures and practices for Versar personnel engaged in field activities at the Pacific Activities Ltd site. This project control document (Health and Safety Plan) was prepared in accordance with the specifications presented in the Versar Inc. Health and Safety Program Manual; OSHA's Safety and Health Standard 29 CFR 1910.120 and Hazard Communication Standard 29 CFR 1910.1200, and OSHA's Lead and Cadmium standards, 29 CFR 1910.1025 and 1910.1027, respectively. Envirocon established their own HASP for construction activities.

The contents of the HASP included provisions for perimeter dust monitoring, worker dust monitoring, personal protection, work zones and decontamination. These items are discussed in the following sections.

4.2 Perimeter Dust Monitoring

The purpose of perimeter dust monitoring was to document the concentration of total particulate dust in the air in order to institute control measures (water sprays and other engineering controls) if necessary based on a set of pre-determined action levels. Adjusted (downwind total dust minus upwind total dust) air particulate results were compared to the USEPA-approved value of 0.15 mg/m^3 of dust in excess of upwind dust levels. Perimeter Air Monitoring results are provided in Table 4 - Perimeter Dust Sample Results. Analytical results are presented in Appendix E.

Versar monitored perimeter air quality by placing two air monitoring stations at strategic upwind/downwind locations at the fence line of the work area. Pumps were moved on a daily basis to accommodate changing weather conditions and shifting work areas. Locations were selected based on the location of the soil/cement mixing equipment, areas expected to have the greatest amount of excavation, the excavation areas containing the greatest levels of target metals, regional wind rose data, and the location of potential off-site receptors.

Each air monitoring station consisted of a high-volume pump/filter assembly with filter media for collecting total dust. Samples were collected with electrically-operated Gilian pumps operated at a rate of approximately four liters per minute (LPM). Filter sample media were changed once a day at the end of the work day (8 to

14 hours). Filter samples were analyzed using NIOSH Procedure 7300. Air particulate filter sample were shipped to American Medical Laboratory, Inc. and analyzed for expedited turnaround results.

Table 4 - Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18*	NS	0.014
6/19*	0.051	0.031
6/20*	0.125	0.049
6/21*	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
6/27	0.409	0.284
6/28**	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059
7/8	0.910	0.158
7/9	0.208	0.257
7/10	0.023	0.131
7/11	0.216	0.257
7/12	0.0565	0.0572
7/16**	0.135	0.978
7/17	NS	NS
7/18**	0.0969	0.315/0.791
7/19	0.145	0.174
7/22	0.902	0.738
7/23**	0.266	0.537
7/25	0.838	0.522
7/26	NS	0.675
7/29**	0.271	0.461

* Background (pre-construction) Perimeter Dust Sample Results,
** Dates when downwind dust levels exceeded 0.150 mg/m^3 over upwind dust levels.
NS 6/18 - An upwind sample was not collected due to faulty power supply to sampling pumps.
7/17 - Construction activites rained out after starting perimeter sampling.
7/26 - Power source to sampling pumps interupted.

Prior to excavation and construction, background readings were collected over a period of four days to establish local background dust concentrations, see Table 4. Increased levels of dust were realized and expected when continuous dry weather conditions occurred.

4.3 Worker Dust Monitoring

Although the HASP required that the site workers don respirators equipped with dust filters, personnel monitoring was performed in accordance with OSHA Permissible Exposure Levels (PELs) for the target compounds, and other applicable sections of OSHA regulations. Worker air sampling protocol to evaluate the total dust and airborne target metals concentrations consisted of air sampling followed by laboratory analysis.

Worker air samples were collected by drawing air through a 37-mm diameter plastic cassette that holds a mixed-cellulose ester filter with a pore size of 0.8 microns. Filters are supported by cellulose backup pads.

Versar monitored worker air quality by placing two air monitoring pumps in the breathing zone of the two workers most likely to have the maximum exposure. Sampling equipment consists of low volume Gilian personnel air sampling pumps, which are calibrated daily to run at approximately 2 LPM prior to their use. These pumps are attached to the workers with the filter cassette located in the breathing zone. The filter were collected at the end of each work shift. The designated personnel were selected based on their location relative to the soil/cement mixing or excavation equipment. The pumps were checked periodically to ensure proper operation (i.e., no dead batteries, excessive dust loading causing reduced flow rate, etc.)

Samples were analyzed for total dust and lead, cadmium and nickel, following NIOSH Procedure 7300. The air particulate filter sample was shipped to American Medical Laboratory, Inc. For analysis. Samples were analyzed for total dust and lead, cadmium, and nickel. Results were compared to the OSHA PELs and the early action levels specified for lead and cadmium in 29 CFR 1910.1025 and 1910.1027. Analytical results were recorded in an on-site log. The log was made available to site workers as well as regulating agencies for review.

Results indicate that onsite workers who were responsible for excavation survey, inspection, geotextile placement, backfilling and grading did not exceed the PELs, while workers responsible for site preparation, excavation, material screening and berm construction exceeded the PELs on a daily basis. To assure worker exposure below OSHA levels, work performed in the restricted zone required hygiene control and use of respirators/personal protective equipment by site workers from the start of the project through the finish of stabilization activities. Water spraying and other engineering control measures were used for dust control when necessary to eliminate visible emissions.

4.4 Work Zones and Traffic Control

Maintaining site control and reducing migration of hazardous materials into uncontaminated areas during on-site activities was accomplished by designating work zones. Work zones limited hazardous area access, contained gross contamination, provided work zone security, and placed a buffer zone between the potentially hazardous area and the rest of the site. The following work zones were established for the project.

- Support Zone (SZ) - Areas located outside P.A.L site security fence. The support zone was enlarged to include the western half of the site after excavation and backfill activities were finished in those areas. The western support zone was separated from the eastern part of the site by temporary fencing.

- Contamination Reduction Zone (CRZ) - Area located between the support zone and exclusion zone to provide access control points to both zones. The CRZ was established in an area designated as 'No Further Action'. The CRZ was located near the main gate and provided a space for the decontamination of personnel and equipment, and as an area to assist the work parties (respirator cartridge exchange, equipment staging, etc.).

- Exclusion Zone - Areas that contained of soil/cement stabilization activities (including soil stockpiles, berm construction area, excavation areas, and soil-cover areas). After finishing stabilization activities on the western half of the site, the exclusion zone was reduced to eastern half of the site. Access control into the exclusion zone was through rigidly defined entrance/exit points which were specified in the daily safety meetings held prior to beginning on-site activities each day.

Personnel who entered the CRZ and the Exclusion Zone through the contamination control line were dressed in the specified level of protection for the specific task. Similarly, personnel and equipment, exiting to the support zone completed decontamination prior to crossing the contamination control line.

4.5 Personal and Equipment Decontamination

Personnel working within the exclusion zone or work area passed through the CRZ upon exiting the area. In the CRZ, decontamination procedures were established for the purpose of removing contamination that may have accumulated on workers during site activities and to prevent contaminants from migrating from the site. During these procedures, methods for properly doffing disposable or thoroughly decontaminated reusable personal protective clothing or equipment were followed to reduce the possibility of contacting potentially contaminated media. Doffing methods included adherence to the sequence below and removing items from the inside out where possible.

1. Equipment drop
2. Outer boot wash
3. Outer boot rinse
4. Outer boot removal
5. Outer glove wash
6. Outer glove rinse
7. Outer glove removal
8. Protective coverall removal
9. Respirator removal
10. Inner glove removal

Good hygiene practices were extremely important in preventing ingestion of the target heavy metals following a work shift. Hands and face were thoroughly washed following the removal of personal protective equipment, to prevent the subsequent ingestion of site contaminants.

At the end of each work day, respirators were thoroughly decontaminated. When decontaminating, this equipment was properly disassembled according to manufacturer specifications, washed in soap and water, rinsed and allowed to dry before reassembly. Disassembly was performed by personnel trained in this task.

Heavy equipment was decontaminated at the end of the project with water sprays from high pressure washers or similar devices. The water generated was incorporated into the soil/cement berm. Personal protection equipment was disposed of by Envirocon.

5.0 POST CLOSURE INSPECTION AND MAINTENANCE

The purpose of the post-closure care and inspection is to maintain the integrity and effectiveness of the soil/cement berm and soil cover areas. In order to assure the operation and integrity of the berm and soil cover areas, visual inspection will be conducted. Inspection criteria for each area is provided below. Inspection forms are provided in Appendix F.

During the post-closure care period the site contact will be Mr. Jeff Goldstein. Mr. Goldstein may be contacted at the following location:

Address: Pacific Activities Limited
2117 State Street. Suite 300
Bettendorf, Iowa 52722-5097

Phone: 319-344-5290
Fax: 319-344-5317

During the post-closure period the berm will remain vacant, while other areas of the yard will be available for industrial operations. Final use in the berm area will prohibit agricultural uses, building construction and excavation. Offsite access to the P.A.L. property and berm is restricted by security fenceing located around perimeter of the property. Access to the berm from on the P.A.L. site is restricted by a second fence and gate system which is tied to the property fence on one side. Access to the berm will not be available without authorization from P.A.L.

5.1 Berm and Yard Inspection and Maintenance

Berm inspection will be conducted quarterly for the first year and annually for an additional period of four years to ensure the integrity of the berm and cover layer. Inspection should identify areas of the berm that have experienced subsidence, differential settlement, or topsoil erosion while vegetation is being established. In addition, inspection should identify unwanted vegetation (e.g. trees, deep-rooted plants) and burrowing rodent populations that may compromise the integrity of the stabilized material in the berm or berm drainage layer.

Repair to subsidence or differential settlement areas will consist of repairing cracks and restoring the drainage layer. Repair of erosional areas may include reconstruction of the berm drainage layer to the original surface

grade in the area of distress and re-vegetating the repaired area. Repairs should be completed in accordance with the construction specifications, attached as Appendix G.

Areas repaired will require re-establishment of vegetative cover. Vegetative cover should be placed in accordance with the specifications for vegetation placement in the construction specifications, located in Appendix G. In addition to maintaining and establishing good vegetative growth, mowing, fertilizing, seeding and mulching will be included as part of post-closure care.

The remainder of this section provides the proper response to problems noted during site inspection.

Problem	Investigation/Procedure/Maintenance
Subsidence/Settlement	• Investigate by visual inspection of ground surface and condition of adjacent fencing and ditches. • If conditions warrant further investigation, remove the drainage layer to check for cracking or deteoration of the soil/cement berm. • After identification of cracking due to settlement or subsidence of the soil/cement berm contact Mr. Michael Place of Versar, Inc. by telephone at 630-268-8555 for further investigation and response.
Distressed Vegetation	• Investigate visually for signs of distress or rodent inhabitation. • Re-vegetate in accordance with project construction specifications.
Unwanted Vegetation and Burrowing Rodents	• Investigate areas for evidence of unwanted vegetation or burrowing rodent inhabitation. • Investigate alternatives to remove, manage or exterminate weeds, trees or rodents from the berm area. • Re-vegetate in accordance with project construction specifications.

5.2 Inspection & Maintenance of Other Areas of the Property

Inspection will be conducted annually for areas other than the berm. In order to prevent conditions which may compromise the integrity of the soil cover layer at "Cover Soil" Grids across the property, a minimum of an annual inspection of these areas will be conducted.

Inspection should identify areas of the property where the crushed stone cover layer has thinned or where the underlying geotextile layer has become exposed. Site workers and operators need to be aware of the locations of 'Soil Cover' Grids and must report exposure of the nonwoven geotextile immediately upon observing the geotextile. Repair to the cover layer will consist of replacing missing stone after repairing or replacing the geotextile layer, if necessary. Maintenance and repairs should be performed in accordance with the construction specifications, provided in Appendix G.

In areas of 'Soil Cover' grids, when performing routine maintenance or facility upgrades that may include excavation, trenching or boring, health and safety provisions should be incorporated. These provisions should include the use of experienced environmental contractors with health and safety trained workers.

Locations where elevated levels of the target metals have been covered are shown on the Figure 3 - Final Soil Cover Grid Plan. Figure 2 - Final Soil/Cement Grid Plan presents the locations where soil has been excavated and the excavation has been backfilled with clean crushed stone.

5.3 Groundwater Monitoring

Groundwater monitoring will be conducted semi-annually for a period of five years. If, after five years of monitoring, no statistically significant increase in the levels of lead, cadmium or nickel is observed in the groundwater, annual monitoring will be implemented for a period of five years. If after the second five year period, no statistically significant increase in the levels of lead, cadmium or nickel is observed in the groundwater, the wells will be properly abandoned.

As part of the removal action work, seven existing monitoring wells were abandoned and three new wells were constructed at the site. The new monitoring wells were installed to monitor up and down gradient groundwater quality after completion the removal action activities. New monitoring well locations are shown on Figure 6 - Monitoring Well Location Plan.

Groundwater will be monitored for cadmium, lead and nickel in accordance with SW846 Method 6010. A groundwater sampling plan is attached as Appendix H.

6.0 RECORD KEEPING

P.A.L., as owner/operator of the property will record and retain an operating record at the facility. At a minimum, the operating record shall contain the following information:

- Locations on the property of restricted activity (primarily subsurface),
- Inspection records, training procedures, and notification procedures,
- Demonstration, certifications, monitoring results, testing, or analytical data relating to the ground water monitoring program, and
- Closure and post-closure care plans and monitoring testing, or analytical data required.

7.0 PROJECT COSTS

Total costs incurred by P.A.L. while responding to the consent order are provided in Table 5 - Engineering and Contractors Costs. The total project cost was $706,401.25.

TABLE 5 - ENGINEERING AND CONTRACTORS COSTS

Project Task	Total Cost
Versar, Inc.	
Professional Services	$63,622.00
Miscellaneous Expenses	$9,330.04
Site Surveys	$4,984.31
Air Monitoring	42,720.25
Construction Inspection	$13,695.53
Final Reporting	$23,265.00
Monitoring Wells	$2,913.75
Envirocon, Inc.	$585,870.37
Total Project Cost	$706,401.25

APPENDIX A

ADMINISTRATIVE ORDER ON CONSENT and REMOVAL ACTION WORK PLAN PACIFIC ACTIVITIES LIMITED DAVENPORT, IOWA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

June 6, 1995

FEDERAL EXPRESS

J. Brian Molloy, Esq.
Piper & Marbury
1200 Nineteenth Street, N.W.
Washington, D.C. 20036-2430

Re: Pacific Activities, Ltd.
626 Schmidt Road
Davenport, Iowa

Dear Brian:

Enclosed you will find a copy of the fully executed and file-stamped Administrative Order on Consent pertaining to the above-referenced matter. Pursuant to Section XXV of the Order, the Order's effective date is the date on which the Order was signed by the Director of Region VII's Superfund Division, which was June 1, 1995.

I have not included a copy of Attachment II (the Workplan) with the Order, as we only have two copies, one of which is Jeff Weatherford's working copy, and the other was filed with the Regional Hearing Clerk along with the Order.

Thank you for your efforts is getting this aspect of this matter concluded in a timely and amicable manner. I look forward to working with you, Curt Beason, and PAL during the course of this matter.

Sincerely,

David A. Hoefer
Assistant Regional Counsel
Office of Regional Counsel

cc: Curtis Beason, Esq.
Jeff Weatherford, SUPR/SARS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

IN THE MATTER OF: PACIFIC ACTIVITIES, LTD. 626 SCHMIDT ROAD DAVENPORT, IOWA Respondent. Proceeding under Section 106(a) of the Comprehensive Environmental Response Compensation and Liability Act, as amended, 42 U.S.C. § 9606(a).	Docket No. VII-95-F-0008

ADMINISTRATIVE ORDER ON CONSENT

TABLE OF CONTENTS

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Order on Consent ("Consent Order") is entered into voluntarily by the United States Environmental Protection Agency ("EPA") and Pacific Activities, Ltd., an Illinois corporation ("PAL"). This Consent Order provides for the performance of the removal action by PAL and the reimbursement of response costs incurred by the United States in connection with property owned by PAL located at 626 Schmidt Road, Davenport, Iowa (the "Site").

2. This Consent Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9606(a), as amended, and delegated to the Administrator of EPA by Executive Order No. 12580, dated January 23, 1987, 57 Fed. Reg. 2,923. This authority was further redelegated to the Regional Administrators of EPA by EPA Delegation Nos. 14-14-A, dated April 16, 1984, and 14-14-C, dated September 13, 1987, and to the Director of EPA Region VII's Waste Management Division by EPA Delegation No. R7-14-14C, dated May 16, 1988.

3. EPA has notified the State of Iowa of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

4. EPA and Respondent agree to comply with and be bound by the terms of this Consent Order. Respondent further agrees that it will not contest the basis or validity of this Consent Order or its terms. Respondent reserves its rights to contest the meaning of

terms in this Consent Order in accordance with Section XV hereof (Dispute Resolution), and in the event that proceedings are initiated to enforce this Consent Order, in such proceedings.

5. By entering into this Consent Order, the objectives of EPA and Respondent are: (a) the performance of a time-critical removal action at the Site designed to protect public health and welfare and the environment and reduce or eliminate any hazard posed to public health by the exposure to workers and others on or near the Site to dust inhalation and ingestion of hazardous substances present in the Site soil; and (b) the recovery by EPA of response and oversight costs incurred by EPA with respect to the Site.

II. PARTIES BOUND

6. This Consent Order applies to and is binding upon Respondent and Respondent's successors and assigns. No change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall in any way alter Respondent's responsibilities under this Consent Order.

7. Respondent shall ensure that its contractors, subcontractors, and representatives receive a copy of and comply with this Consent Order. Respondent shall be responsible for any noncompliance with this Consent Order.

III. FINDINGS OF FACT

EPA has determined that:

8. PAL is an Illinois corporation authorized to transact business in the State of Iowa.

9. From 1938 until 1954 a portion of the Site was owned by Davenport-Bessler Corporation and operated as a diesel locomotive manufacturing foundry. From 1954 until 1964 A.G.S. Associates, an Iowa general partnership, owned the Site. During part of A.G.S. Associates' ownership, the Site was leased to Alter Company, an Iowa corporation. Alter Company operated a scrap metal processing and alloy metal production/fabrication business at the Site during the period of the lease.

10. The Site was acquired by Sherman Industries, Inc., an Iowa corporation, in 1964. The Site was then leased by Sherman Industries, Inc. to Alloy Metal Products, Inc. ("AMPI"), an Iowa corporation. From 1964 until late 1987 AMPI conducted smelting operations for the production of nickel alloys at the Site. AMPI purchased various grades of nickel alloy scraps in the form of grindings, turnings, solids, borings, catalysts, flue dusts, and sludges. These scraps were subsequently melted in electric arc furnaces, poured into 35-50 pound "pigs", and then sold as nickel additive. When these scraps were melted, flue dust was collected in an emission control dust collection system connected to the furnace. AMPI would collect the flue dust (commonly referred to as "baghouse dust") and store it on-Site until it could be recycled back into the nickel "pig" process. In May of 1987 AMPI filed a

voluntary bankruptcy petition under Chapter 7 of the United States Bankruptcy Code (Title 11 of the United States Code). An EPA inspection of the Site conducted in November 1988, revealed that there was a large quantity of baghouse dust containing lead, nickel, cadmium, and other heavy metals on-Site. On March 15, 1989 Respondent acquired the Site from the AMPI bankruptcy estate.

11. EPA conducted a sampling investigation of the Site in October 1993 in an effort to ascertain the extent of contamination at the Site. The following is a summary of such sampling investigation:

a. Twenty-four waste piles totalling approximately 231.5 cubic yards were identified. Eleven of the twenty-four waste piles tested hazardous for cadmium by the toxicity characteristic leaching procedure ("TCLP"). Nine of the twenty-four waste piles tested hazardous for lead by the TCLP. The total lead values for the eighteen waste piles which exceeded 500 mg/kg ranged from 570 to 160,000 mg/kg with the average lead concentration per waste pile being approximately 14,090 mg/kg. The total cadmium values for the twenty-two waste piles which exceeded 40 mg/kg ranged from 46 to 2,400 mg/kg with the average cadmium concentration per waste pile being approximately 156 mg/kg. The total nickel values for the twenty-two waste piles which exceeded 2,000 mg/kg ranged from 3,800 to 120,000 mg/kg with the average nickel concentration being approximately 21,458 mg/kg.

b. Floor sweepings taken from the inside of a building located on-Site tested hazardous for cadmium and lead by the TCLP. Floor sweepings taken from the inside of such building contained up to 1,500 mg/kg total cadmium, 72,000 mg/kg total nickel, and 140,000 mg/kg total lead.

c. Seventy-three samples, 28 from the approximate 0' to 1.5' interval and 45 from the approximate 1.5' to 10' interval, from 40 Sitewide borings were taken and analyzed. Sixteen of the twenty-two samples analyzed for cadmium by the TCLP tested hazardous for cadmium. Eleven of the twenty-two samples analyzed for lead by the TCLP tested hazardous for lead. Seventeen of the twenty-eight approximate 0' to 1.5' interval samples taken contained cadmium levels above the currently recognized soil cadmium remediation level of 40 mg/kg. The total cadmium levels for the seventeen samples which exceeded 40 mg/kg ranged from 41 to 2,400 mg/kg with the average cadmium concentration being approximately 305 mg/kg. Twenty-three of the twenty-eight approximate 0' to 1.5' interval samples taken contained lead levels above the currently recognized soil lead remediation level of 500 mg/kg. The total lead levels for the twenty-three samples which exceeded 500 mg/kg ranged from 520 to 49,000 mg/kg with the average lead concentration being approximately 4,971 mg/kg. Fifteen of the twenty-eight approximate 0' to 1.5' interval samples taken contained nickel levels above

the currently recognized soil nickel remediation level of 2,000 mg/kg. The total nickel levels for the fifteen samples which exceeded 2,000 mg/kg ranged from 2,300 to 42,000 mg/kg with the average nickel concentration being approximately 9,377 mg/kg. Six of the forty-five approximate 1.5+' interval samples taken contained nickel levels above the currently recognized soil nickel remediation level of 2,000 mg/kg. The total nickel levels for the six samples which exceeded 2,000 mg/kg ranged from 2,800 to 26,000 mg/kg with the average nickel concentration being approximately 1,731 mg/kg. Eleven of the forty-five approximate 1.5+' interval samples taken contained lead levels above the currently recognized soil lead remediation level of 500 mg/kg. The total lead levels for the eleven samples which exceeded 500 mg/kg ranged from 530 mg/kg to 48,000 mg/kg with the average lead concentration being approximately 2,300 mg/kg.

12. The area immediately surrounding the Site is zoned industrial/commercial, however, there is a residential area located less than 500 feet to the north of the Site. Although the Site is fenced and gated, EPA personnel have observed children occasionally playing on the Site. In addition, there is a school and church located approximately 1,500 feet to the east of the Site, and a school located approximately 3,500 feet to the north of the Site. The southeast portion of the Site is currently open to the public

as a local community recycling drop on Thursdays, Fridays, and Saturdays.

13. Lead is present in Site soils in significant quantities. EPA has classified lead as a Class B2 probable human carcinogen. Lead can be toxic to humans and animals by ingestion and inhalation. Human exposure to lead may result in: premature births; smaller babies; decreased mental ability; decreased growth in children; decreased reaction time; weakness in fingers, wrists, and ankles; increased blood pressure; anemia; kidney damage; and reproductive system damage.

14. Cadmium is present in Site soils in significant quantities. EPA has classified cadmium as a Class B1 probable human carcinogen. Cadmium can be toxic to humans and animals by ingestion and inhalation. Human exposure to cadmium may result in: lung damage; kidney damage; stomach irritation; diarrhea; high blood pressure; and iron poor blood.

15. Nickel is present in Site soils in significant quantities. EPA has classified nickel refinery dust as a Class A human carcinogen. Nickel can be toxic to humans and animals by ingestion and inhalation. Human exposure to nickel may result in cancer of the lung and nasal sinuses in humans, and an allergic reaction that results in skin rashes and asthma.

16. The principal hazard posed to human health by the hazardous substances located in the Site soils is toxic exposure to workers and others on or near the Site by dust inhalation and ingestion.

IV. CONCLUSIONS OF LAW AND DETERMINATIONS

Based upon the Findings of Fact set forth above, EPA has determined and concluded that:

17. The Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

18. The contaminants found at the Site, as identified in the Findings of Fact above as lead, cadmium and nickel, are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

19. Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

20. Respondent is liable under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), as it is the "owner" of the Site, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1).

21. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

22. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

23. The actions required by this Consent Order are necessary to protect the public health, welfare, or the environment, and are

consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300.

V. ORDER ON CONSENT

Based upon the foregoing Findings of Fact, Conclusions of Law and Determinations, it is hereby ordered and agreed that Respondent shall comply with the following provisions, including but not limited to all attachments to this Consent Order, and all documents incorporated by reference into this Consent Order, and perform the following actions:

Work to Be Performed

24. Respondent shall conduct a removal action at the Site in accordance with the provisions and schedule set forth in the Removal Action Workplan ("RAW") which is attached hereto as Attachment II, and incorporated herein. If EPA determines that the response action provided for in the RAW is not adequately protective of public health, welfare, or the environment, it may require revisions to, or modify the RAW. In the event that EPA determines that minor revisions are necessary to the RAW to make it adequately protective of public health, welfare, or the environment, Respondent shall make such revisions upon notification by EPA of the required revisions.

25. Respondent shall notify EPA at least seven (7) days prior to commencing any on-Site work pursuant to the RAW. Respondent shall not commence or undertake any removal action on-Site without prior EPA approval.

Designation of Contractor and Project Coordinators

26. All activities performed pursuant to this Consent Order (the "Work") shall be under the direction and supervision of qualified personnel. Within twenty-one (21) days ("days", as used herein, shall refer to calendar days) of the effective date of this Consent Order, and before the Work begins, Respondent shall notify EPA in writing of the names, titles, and qualifications of the principal personnel, including contractors, subcontractors, consultants, and laboratories, to be used in carrying out the Work. The qualifications of the persons responsible for undertaking the Work shall be subject to EPA's review, for verification that such persons meet minimum technical background and experience requirements. This Consent Order is contingent upon Respondent's demonstration to EPA's satisfaction that Respondent is qualified to perform properly and promptly the actions set forth in this Consent Order. If EPA disapproves of the technical qualifications of any person, Respondent shall notify EPA of the identity and qualifications of a replacement within twenty-one (21) days of receipt of EPA's disapproval. If EPA disapproves of the replacement, EPA reserves the right to terminate this Consent Order and to conduct the Work (or any portion thereof), and/or seek reimbursement for costs and penalties from Respondent. During the course of the performance of the Work, Respondent shall notify EPA in writing of any changes or additions in the principal personnel used to carry out the Work, including their names, titles, and qualifications. EPA shall have the same right to approve changes

and additions to principal personnel as it has hereunder regarding the initial notification.

27. Within five (5) days after the effective date of this Consent Order, Respondent shall designate a Project Coordinator who shall be responsible for the administration of all of Respondent's actions required by the Consent Order. Respondent shall submit the Project Coordinator's name, address, telephone number, and qualifications to EPA. To the greatest extent possible, the Project Coordinator shall be present on-Site or readily available during Site work. EPA retains the right to disapprove of any Project Coordinator named by Respondent. If EPA disapproves of a selected Project Coordinator, Respondent shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number, and qualifications within twenty-one (21) days following EPA's disapproval. Receipt by Respondent's Project Coordinator of any written notice or written communication from EPA relating to this Consent Order shall constitute receipt by Respondent.

28. EPA has designated Jeffrey Weatherford, P.E., of EPA Region VII's Superfund Division, as its Project Coordinator. All submissions required by this Consent Order to be made to EPA shall be sent by certified mail, return receipt requested, overnight delivery service, or hand delivered to EPA's Project Coordinator at the following address:

Jeffrey Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

29. EPA's Project Coordinator shall be responsible for overseeing Respondent's implementation of this Consent Order. EPA's Project Coordinator shall have the authority vested in an on-scene coordinator by the NCP, including the authority to halt, conduct, or direct any work required by this Consent Order, or to direct any other removal action undertaken at the Site. The absence of EPA's Project Coordinator from the Site shall not be cause for stoppage of work unless specifically directed by EPA.

30. EPA and Respondent shall each have the right, subject to paragraph 27 above, to change their respective Project Coordinators. The other party must be notified in writing at least ten (10) days prior to any such change.

Health and Safety Plan

31. Within thirty (30) days after the effective date of this Consent Order, Respondent shall submit to EPA for review and comment a plan that ensures the protection of the public health and safety during the performance of the Work. This plan shall be prepared in accordance with 40 C.F.R. § 300.150.

Quality Assurance and Sampling

32. All sampling and analyses performed pursuant to this Consent Order shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain of custody procedures.

Respondent shall ensure that all laboratories used by it to perform analyses under this Consent Order participate in a QA/QC program that complies with all applicable EPA guidance. Respondent shall follow the following documents, as appropriate, as guidance for QA/QC and sampling: "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures," OSWER Directive Number 9360.4-01; "Environmental Response Team Standard Operating Procedures," OSWER Directive Numbers 9360.4-02 through 9360.4-08.

33. Upon request by EPA, Respondent shall, at its expense, have any laboratory used by it for the analysis of samples pursuant to this Consent Order analyze samples submitted by EPA for quality-assurance monitoring. Respondent shall provide to EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis under this Consent Order.

34. Upon request by EPA, Respondent shall allow EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by Respondent while performing the Work. Respondent shall notify EPA not less than seven (7) days in advance of any such sample collection activity. EPA shall have the right to take any additional samples that it deems necessary.

Off-Site Shipments

35. All hazardous substances, pollutants or contaminants removed from the Site pursuant to this Consent Order for treatment, storage or disposal shall be treated, stored, or disposed of at a

facility approved by EPA, and in compliance, as determined by EPA, with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and the Off-Site Rule, 40 C.F.R. § 300.440.

EPA Approvals

36. All approvals by EPA required by this Consent Order will not be unreasonably withheld.

VI. ADDITIONAL WORK

37. EPA may determine that in addition to tasks defined in the EPA-approved RAW, other additional work may be necessary to accomplish the objectives of this Consent Order. EPA may request that Respondent perform these response actions in addition to those required by the RAW including any approved modifications if it determines that such actions are necessary for a complete response action. Respondent shall confirm its willingness to perform the additional work in writing to EPA within seven (7) days of receipt of the EPA request or Respondent shall invoke dispute resolution. Subject to resolution of any dispute, Respondent shall implement the additional tasks which EPA determines are necessary to achieve the objectives of this Consent Order. The additional work shall be completed according to the standards, specifications, and schedules set forth or approved by EPA in a written modification to the RAW. In the event Respondent does not agree to perform the additional work, EPA reserves the right to conduct the work itself, to seek reimbursement from Respondent, and/or to seek any other appropriate relief.

VII. PROGRESS REPORTS

38. Respondent shall submit weekly progress reports to EPA by Wednesday of each following week beginning the second full week after the effective date of this Consent Order. At a minimum, with respect to the preceding week, these progress reports shall: (1) describe the actions which have been taken to comply with this Consent Order during the reporting period; (2) include all results of sampling and tests and all other data relating to this Consent Order and received by Respondent during the reporting period; and (3) describe work planned for the next two weeks.

VIII. FINAL REPORT

39. Within sixty (60) days after completion of all removal actions required under this Consent Order, Respondent shall submit to EPA for review and approval a final report summarizing the actions taken to comply with this Consent Order. The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Consent Order, a listing of quantities and types of materials removed from the Site or handled on-Site, a listing of the ultimate destination of any hazardous substances removed from the Site, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

IX. DEED RESTRICTIONS

40. Within thirty (30) days of EPA's approval of the final report or prior to Respondent's transfer of the Site (or any portion thereof) to a third party, whichever occurs earlier, Respondent shall record with the office of the recorder of deeds for Scott County, Iowa, a Declaration of Covenants and Restrictions in the form identical to Attachment III to this Consent Order. Each subsequent instrument conveying any interest in the Site shall reference such recorded Declaration of Covenants and Restrictions.

X. EMERGENCY RESPONSE AND NOTIFICATION

41. If any incident, or change in Site conditions, during the performance of the Work causes or threatens to cause an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action to prevent, abate or minimize such threat. Respondent shall also immediately notify EPA's Project Coordinator at (913) 551-7695, and if EPA's Project Coordinator is unavailable, the EPA Region VII Duty Officer at (913) 236-3778. In addition, Respondent shall submit a written report to EPA within seven (7) days after such incident, or change in Site conditions, setting forth the events that occurred and the measures taken or to be taken to mitigate any threat. This reporting requirement is in addition to, not in lieu of, reporting

required pursuant to Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

42. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment.

XI. ACCESS

43. Commencing upon the effective date of this Consent Order, Respondent agrees to provide EPA and its representatives, including its contractors, access at all reasonable times to the Site and any other property to which access is required for the implementation of this Consent Order, to the extent access to the property is controlled by Respondent, for the purposes of conducting any activity related to this Consent Order including, but not limited to:

a. Monitoring the Work;

b. Verifying any data or information submitted to EPA;

c. Conducting investigations relating to contamination at or near the Site;

d. Obtaining samples;

e. Assessing the need for, planning, or implementing additional response actions at or near the Site;

f. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondent or its agents; and

g. Assessing Respondent's compliance with this Consent Order.

44. To the extent that the Site or any other property to which access is required for the implementation of this Consent Order and its objectives is owned or controlled by persons other than Respondent, Respondent shall use best efforts to secure from such persons access for Respondent, as well as for EPA and its representatives, including, but not limited to, its contractors. For the purposes of this paragraph, "best efforts" includes offering to provide reasonable consideration to the owner of property for which access is required to perform the Work. If any access required to complete the Work is not obtained within thirty (30) days of the effective date of this Consent Order, or within thirty (30) days of the date EPA notifies Respondent in writing that additional access beyond that previously secured is necessary, Respondent shall promptly notify EPA, and shall include in that notification a summary of the steps Respondent has taken to attempt to obtain access. EPA may, as it deems appropriate, assist Respondent in obtaining access. Respondent shall reimburse EPA, in accordance with the procedures in Section XIV (Reimbursement of EPA's Costs), for all costs incurred by EPA in obtaining access.

45. Notwithstanding any provision of this Consent Order, EPA retains all of its access authorities and rights, including enforcement authorities related thereto, under CERCLA and any other applicable statutes or regulations.

XII. RECORD PRESERVATION

46. One complete set of all non-privileged records and documents in Respondent's possession that relate to this Consent Order shall be preserved while this Consent Order is in effect and for a minimum of six (6) years after the termination of this Consent Order. Respondent shall acquire and retain copies of all non-privileged records and documents that relate to this Consent Order that are in the possession of their employees, agents, accountants, contractors, or attorneys. At the conclusion of this six (6) year period, Respondent shall notify EPA at least ninety (90) days prior to the destruction of any such records and documents, and, upon EPA's request, Respondent shall deliver any such records or documents to EPA.

47. If Respondent asserts that any records or documents are privileged under the attorney-client privilege, or any other privilege recognized by federal or state law, it shall provide the following information to EPA: (a) the title of the record or document; (b) the date of the record or document; (c) the names and titles of the author(s) and recipient(s) of the record or document; (d) a description of the contents of the record or document; and (e) the privilege asserted.

48. Respondent may assert a confidentiality claim pursuant to 40 C.F.R. Part 2 with respect to part or all information submitted to EPA pursuant to this Consent Order, provided such claim is allowed by Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7).

XIII. FINANCIAL ASSURANCE

49. Respondent has agreed to enter into an irrevocable standby trust agreement establishing a trust fund in the amount of the estimated cost of implementing this Consent Order, naming EPA as the beneficiary, and has provided a copy of this trust agreement to EPA. If Respondent fails to complete the removal action required by this Consent Order, EPA may complete same utilizing the trust fund.

XIV. REIMBURSEMENT OF EPA'S COSTS

50. Respondent has received a final accounting in the form of a Regional Cost Summary from EPA of response costs incurred with respect to the Site for the period prior to April 4, 1995 ("Past Response Costs"), Respondent shall remit a certified or cashier's check to EPA payable in that amount within thirty (30) days of the effective date of this Consent Order.

51. Following the effective date of this Consent Order, EPA will periodically submit to Respondent an accounting of all response costs including oversight costs incurred by EPA with respect to this Consent Order ("Future Response Costs"). Future Response Costs shall include all of EPA's direct and indirect costs relating to the Site incurred after April 4, 1995, including, but not limited to, time and travel costs of EPA personnel, contractor costs, costs in overseeing Respondent's implementation of the requirements of this Consent Order and activities performed by EPA relating to this Consent Order, and any costs incurred while

assisting Respondent in obtaining access and costs of redoing any of Respondent's tasks.

52. Interest at the rate specified for investments for the Hazardous Substances Superfund shall begin to accrue on any unpaid balance on the thirty-first (31st) day following Respondent's receipt of EPA's accounting.

53. All payments to EPA under this Section shall be made by certified or cashier's check made payable to "EPA Hazardous Substance Superfund" and shall include the Site name, the EPA Site identification number SJ, and the EPA Docket Number assigned to this matter, and shall be remitted to:

Mellon Bank
Attn: Superfund Accounting
EPA Region VII
(Comptroller Branch)
Post Office Box 360748M
Pittsburgh, PA 15251

54. A copy of the check shall be sent simultaneously to EPA's Project Coordinator.

55. Respondent shall identify any contested costs and the basis of its objection. All undisputed costs shall be remitted by Respondent in accordance with the time frame set forth above. Disputed costs shall be paid by Respondent into an escrow account while the dispute is pending. Respondent bears the burden of establishing erroneous or improper charges.

XV. DISPUTE RESOLUTION

56. If Respondent objects to any EPA notice of disapproval or requirement made pursuant to this Consent Order, Respondent shall notify EPA's Project Coordinator in writing of its objections

within fourteen (14) days of receipt of the such notice or requirement. Respondent's written objections shall define the dispute and state the basis of Respondent's objections. Within fourteen (14) days of receipt of Respondent's objection, EPA will respond to Respondent in writing, specifically addressing the points raised by Respondent and identifying points of agreement or disagreement. EPA and Respondent then have an additional fourteen (14) days to reach agreement.

57. If agreement is not reached within the final fourteen (14) day period referenced above, Respondent may request a determination by the Division Director of EPA Region VII's Superfund Division (the "Superfund Division Director"), who will resolve the dispute and provide a written statement of his/her decision to the parties. Respondent shall proceed in accordance with the Superfund Division Director's decision regarding the matter in dispute, unless Respondent invokes the alternative dispute resolution procedures set forth below. Notwithstanding the invocation of mediation as set forth below, Respondent shall proceed to take any action required by those portions of this Consent Order that EPA determines are not substantially affected by the dispute.

58. Respondent may make a written request for mediation within five (5) days following the issuance of the Superfund Division Director's decision as provided for in the preceding paragraph if such decision involves a "mediated matter" as defined in paragraph 59 below. In the event of such a request, the parties

agree to follow the procedures set forth in paragraphs 59 through 66 below.

59. For the purposes of this section, matters that may be subject to mediation ("mediated matters") are: (1) the need for additional work beyond that required by the RAW and Section V (Order on Consent) of this Consent Order, costing an additional $50,000 or more; (2) the existence of a force majeure event pursuant to Section XVI (Force Majeure) of this Consent Order; and (3) the approval by EPA of Respondent's certification of completion as provided for in paragraph 93 below. Respondent may invoke the mediation process no more than three (3) times during the pendency of this Order.

60. EPA and Respondent agree that they will equally share the costs of mediation. EPA's Project Coordinator will notify Respondent of EPA's ability to share equally the costs of mediation within five (5) days of EPA's receipt of Respondent's request for mediation. This time period may be extended by the EPA Project Coordinator if necessary to determine the availability of EPA funds to share the costs of mediation. EPA's ability to share the costs of mediation will be determined by EPA in its sole discretion and shall not be subject to dispute resolution or judicial review. Upon written notice by EPA's Project Coordinator to Respondent that EPA cannot equally share the costs of mediation, the Superfund Division Director's decision shall be incorporated into and become an enforceable part of this Consent Order. If EPA notifies

Respondent that it can equally share the expenses of mediation then the parties shall follow the procedures below.

61. If the parties use EPA's Dispute Resolution Support Services Contract they agree to select a mediator in accordance with the following procedures:

(a) Upon receipt of Respondent's request for mediation, and following EPA's notification that it can share the expenses of mediation, the parties will be forwarded a list of mediators (the "Mediator Selection List") available through the Dispute Resolution Support Services Contract managed by EPA.

(b) Within five (5) days of Respondent's receipt of the Mediator Selection List, the parties shall simultaneously provide to each other a letter (the "Mediator Nomination Letter") which shall contain the names of five (5) persons from the Mediator Selection List nominated to serve as mediators for the Mediated Matter in dispute.

(c) The mediators nominated by each party must not have any present or planned future business relationships with the parties, other than for mediation activities. They must also agree to the terms and conditions for mediation contained in this Consent Order and enter into an agreement for the provision of alternative dispute resolution services with the parties. All persons nominated shall be provided with a copy of this Consent Order by the nominating party. Any conflicts of interest or refusal to comply with paragraphs 64 and 65 of

this section shall automatically result in the rejection of said nominee.

(d) Within five (5) days of the receipt of the Mediation Nomination Letters, each party shall advise the other in writing of acceptable nominees. All acceptable nominees who are not automatically rejected pursuant to subparagraph (c) above, shall comprise the Mediator Nomination List. The parties shall select a mediator from the Mediator Nomination List and enter into an agreement for mediation services with such mediator through negotiation and by mutual consent within twenty (20) days of the receipt of the Mediation Nomination Letters.

Alternatively, the parties may select a mediator from any other source of mediators. In this event, the provisions of paragraph 61(c) shall continue in effect.

62. The parties agree that the time period for mediation of the matter in dispute is limited to thirty (30) days from the date the parties sign an agreement with a Mediator. This time period may be extended by mutual consent of the parties.

63. If for any reason the parties are unable to select a mediator, or are unable to approve and execute an agreement for mediation services, or are unable to complete mediation, within the time periods for those activities specified in paragraphs 61 and 62 above, the Superfund Division Director's decision shall be incorporated into and shall become an enforceable part of this Order upon the expiration of such time period.

64. Unless the parties agree otherwise in writing, the mediator's role shall be limited to facilitating negotiation between the parties. Mediation sessions shall not be recorded verbatim and no formal minutes or transcripts shall be maintained. Unless the parties agree otherwise, the mediator shall make no written findings or recommendations.

65. Meetings or conferences with the mediator shall be treated as confidential settlement negotiations. Statements made by any person during any such meetings or conferences shall be deemed to have been made in compromise negotiations within the meaning of Rule 408 of the Federal Rules of Evidence and applicable state rules of evidence, and shall not be offered in evidence in any proceeding by any person. The mediator will be disqualified as a witness, consultant or expert in any pending or future action relating to the subject matter of the mediation, including those between persons not a party to the mediation. If Respondent fails to comply with the mediation confidentiality requirements of this section, then it will forfeit its rights, if any remain, under this Consent Order to request future mediation and may be responsible for stipulated penalties for such breach as provided in Section XVII (Stipulated/Statutory Penalties).

66. Any agreement to resolve the dispute reached by the parties pursuant to this section shall be in writing and shall be signed by both parties. The written agreement shall specify what portions of the Superfund Division Director's decision are superseded and/or modified. If the written agreement is not signed

by Respondent within seven (7) days after the resolution of the dispute it shall be null and void and the Superfund Division Director's decision shall be incorporated into and become an enforceable part of this Consent Order.

67. No action, decision, or directive made by EPA, including without limitation the Superfund Division Director pursuant to this Consent Order shall constitute final agency action giving rise to any rights to judicial review prior to EPA's initiation of judicial action to compel Respondent's compliance with this Consent Order.

68. Respondent is not relieved of its obligation to perform and conduct activities and submit deliverables in accordance with the schedule set forth in this Consent Order while a matter is pending in dispute resolution. The invocation of dispute resolution does not stay stipulated penalties under this Consent Order. If, however, Respondent prevails in the dispute, deadlines directly affected by the matters in dispute shall be extended for a period of time equal to the time taken to resolve the dispute under the procedures of this Section, plus reasonable time for remobilization, as determined by EPA.

XVI. FORCE MAJEURE

69. Respondent agrees to perform all requirements under this Consent Order within the time limits established under this Consent Order, unless the performance is delayed by a force majeure. For purposes of this Consent Order, a force majeure is defined as any event arising from causes beyond the control of Respondent or of any entity controlled by Respondent, including but not limited to

its contractors and subcontractors, that delays or prevents performance of any obligation under this Consent Order despite Respondent's best efforts to fulfill the obligation. Force majeure does not include financial inability to complete the work or increased cost of performance.

70. Respondent shall notify EPA orally within twenty-four (24) hours after Respondent becomes aware of the event, and in writing within three (3) days after Respondent becomes aware of any event which constitutes a force majeure. Such notice shall: (i) identify the event causing the delay or anticipated delay; (ii) estimate the anticipated length of delay, including necessary demobilization and re-mobilization; (iii) state the measures taken or to be taken to minimize the delay; and (iv) estimate the timetable for implementation of the measures. Respondent shall take all reasonable measures to avoid and minimize the delay. Failure to comply with the notice provision of this Section may, as reasonably determined by EPA, waive any claim of force majeure by the Respondent.

71. If EPA determines that a delay in performance of a requirement under this Consent Order is or was attributable to a force majeure, the time period for performance of that requirement will be extended as deemed necessary by EPA. Such an extension shall not alter Respondent's obligation to perform or complete other tasks required by the Consent Order which are not directly affected by the force majeure.

XVII. STIPULATED/STATUTORY PENALTIES

72. Unless there has been a written modification of a compliance date by EPA or an excusable delay as defined under Section XVI (Force Majeure), if Respondent fails to meet any requirement of this Consent Order, Respondent shall pay stipulated penalties as set forth below. Compliance by Respondent shall include completion of an activity under this Consent Order or any matter under this Consent Order in a manner acceptable to EPA, and within the specified time schedules in and approved under this Consent Order.

a. For failure to complete the Work in the time period or the manner required hereunder:

i. $200 per day for the first through thirtieth days of noncompliance; and

ii. $500 for the thirty-first day and each succeeding day of noncompliance thereafter.

b. For failure to submit a progress report as called for in Section VII above, or the final report as called for in Section VIII above in the time period or manner required hereunder:

i. $100 per day for the first through thirtieth days of noncompliance; and

ii. $250 per day for the thirty-first day and each succeeding day of noncompliance thereafter.

73. All penalties shall begin to accrue on the date that complete performance is due or a violation occurs and shall

continue to accrue through the final day of correction of the noncompliance. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Order.

74. All penalties owed under this Section shall be due within thirty (30) days of receipt by Respondent of a written demand by EPA for payment thereof. Interest shall begin to accrue on the unpaid balance at the end of this thirty (30) day period. Interest will accrue on the unpaid balance until such penalties and interest have been paid in full and will be compounded annually.

75. All penalties shall be made by certified or cashier's check made payable to "EPA Hazardous Substance Superfund" and shall include the Site name, the EPA Site identification number SJ, the EPA Docket Number assigned to this matter, and shall reference that they are in payment of stipulated penalties and shall be remitted to:

Mellon Bank
Attn: Superfund Accounting
EPA Region VII
(Comptroller Branch)
Post Office Box 360748M
Pittsburgh, PA 15251

76. The stipulated penalties set forth in this Section do not preclude EPA from pursuing any other remedies or sanctions which may be available to EPA by reason of Respondent's failure to comply with any of the requirements of this Consent Order, nor shall payment of said penalties relieve Respondent of the responsibility to comply with this Consent Order. However, EPA will be precluded from seeking other judicial or administrative penalties for those

violations specified in this Section unless Respondent fails to pay penalties assessed pursuant to this Section.

77. Respondent is advised that, pursuant to Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), any person who willfully violates or fails or refuses to comply with an order issued pursuant to that Section, without sufficient cause, may, in addition to an action brought in the appropriate United States District Court to enforce the order, be fined not more than $25,000.00 for each day in which such violation occurs or such failure to comply continues. In addition, pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), any person who is liable for a release or threat of release of a hazardous substance and who fails without sufficient cause to provide properly the removal or remedial actions specified in an order issued pursuant to Section 106 of CERCLA may be liable to the United States for punitive damages in an amount equal to, and not more than three times the amount of any costs incurred by the United States as a result of such failure to take proper action.

XVIII. RESERVATION OF RIGHTS

78. Except as specifically provided in this Consent Order, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, at, or from the Site. Further, except as provided in paragraph 76 hereof, nothing herein

shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Consent Order, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring the Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law. EPA reserves the right to bring an action against Respondent under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States related to this Consent Order or the Site and not reimbursed by Respondent.

XIX. OTHER CLAIMS

79. By issuance of this Consent Order, the United States and EPA assume no liability for injuries or damages to persons or property resulting from Respondent's acts or omissions. The United States or EPA shall not be deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Consent Order.

80. Nothing in this Consent Order constitutes a satisfaction of or release from any claim or cause of action against any person not a party to this Consent Order, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106(a) and 107(a) of CERCLA, 42 U.S.C. §§ 9606(a) and 9607(a).

81. This Consent Order does not constitute a preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

Respondent waives any claim to payment under Sections 106(b), 111, and 112 of CERCLA, 42 U.S.C. §§ 9606(b), 9611, and 9612, against the United States or the Hazardous Substance Superfund arising out of any action performed under this Consent Order.

82. No action or decision by EPA pursuant to this Consent Order shall give rise to any right to judicial review except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XX. INDEMNIFICATION

83. Respondent agrees to indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of, acts or omissions of Respondent, Respondent's officers, directors, employees, agents, contractors, successors or assigns, in carrying out actions pursuant to this Consent Order; and for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of work on or relating to the Site, including claims on account of construction delays. In addition, Respondent agrees to pay the United States all costs incurred by the United States, including litigation costs arising from or on account of claims made against the United States based on any of the acts or omissions referred to in this paragraph.

XXI. COMPLIANCE WITH OTHER LAWS

84. Respondent shall perform all actions required pursuant to this Consent Order in accordance with all applicable local, state,

and federal laws and regulations except as provided in CERCLA Section 121(e) and 40 C.F.R. § 300.415(i). In accordance with 40 C.F.R. § 300.415(i), EPA has determined that all on-site actions required pursuant to this Consent Order, to the extent practicable, and considering the exigencies of the situation, attain applicable or relevant and appropriate requirements ("ARARs") under federal environmental or state environmental or facility siting laws.

XXII. MODIFICATIONS

85. This Consent Order may be amended by mutual agreement of EPA and Respondent. Amendments shall be in writing and shall be effective when signed by EPA.

86. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondent shall relieve Respondent of its obligation to obtain such formal approval as may be required by this Consent Order, and to comply with all requirements of this Consent Order unless it is formally modified.

XXIII. COVENANT NOT TO SUE

87. Except as otherwise specifically provided in this Consent Order, upon issuance of the EPA notice referred to in Section XXVI (Termination and Satisfaction) below, EPA covenants not to sue Respondent for judicial imposition of damages or civil penalties or to take administrative action against Respondent for any failure to perform the work required by this Consent Order except as otherwise reserved herein.

88. Except as otherwise specifically provided in this Consent Order, in consideration and upon Respondent's payment of EPA's costs as specified in Section XIV of this Consent Order, EPA covenants not to sue or to take administrative action against Respondent pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), for recovery of any past or future response costs incurred by the United States in connection with this removal action or this Consent Order or any cost incurred by EPA Region VII with regard to this Site prior to April 4, 1995. This covenant not to sue shall take effect upon the receipt by EPA of all payments required by Section XIV (Reimbursement of EPA's Costs).

89. These covenants not to sue are conditioned upon the complete and satisfactory performance by Respondent of its obligations under this Consent Order. These covenants not to sue extend only to Respondent and do not extend to any other person.

XXIV. CONTRIBUTION PROTECTION

90. With regard to claims for contribution against Respondent for matters addressed in this Consent Order, EPA and Respondent agree that Respondent is entitled to protection from contribution actions or claims to the extent provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4). Nothing in this Consent Order precludes the United States or Respondent from asserting any claims, causes of action or demands against any persons not parties to this Order for indemnification, contribution, or cost recovery.

XXV. EFFECTIVE DATE AND SEVERABILITY

91. The effective date of this Consent Order shall be the date that it is signed by EPA.

92. If a court issues an order that invalidates any provision of this Consent Order or finds that Respondent has sufficient cause not to comply with one or more provisions of this Consent Order, EPA and Respondent shall remain bound to comply with all provisions of this Consent Order not invalidated or determined to be subject to a sufficient cause defense by the court's order.

XXVI. TERMINATION AND SATISFACTION

93. This Consent Order shall terminate when Respondent demonstrates in writing and certifies to EPA that all activities required under this Consent Order including any additional work, the payment of Past and Future Response Costs, and any stipulated penalties demanded by EPA have been performed and EPA has approved the certification. EPA will make it a goal to approve or disapprove the certification within ninety (90) days of its receipt. If EPA disapproves the certification, it will specify in writing the reasons therefor. Termination of this Consent Order shall not, however, terminate Respondent's obligation to comply with Sections XII (Record Preservation), XVIII (Reservations of Rights), XX (Indemnification), and XXI (Compliance With Other Laws) of this Consent Order.

94. The certification shall be signed by a corporate official of Respondent who is in charge of a principal business function. Such representative shall make the following attestation: "I

certify that the information contained in or accompanying this certification is true, accurate, and complete."

PACIFIC ACTIVITIES, LTD.,
an Illinois corporation

May 17, 1995 by: _____
VICE PRESIDENT

May 24, 1995 _____
David A. Hoefer
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region VII

IT IS SO ORDERED

June
~~May~~ 1, 1995 _____
Michael J. Sanderson
Director, Superfund Division
U.S. Environmental Protection Agency
Region VII

REMOVAL ACTION WORKPLAN
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

DOCKET NO. VII-95-F-0008

Prepared for:

Pacific Activities Limited
626 Schmidt Road
Davenport, Iowa

Prepared by:

Versar, Inc.
1520 Kensington Road
Suite 115
Oak Brook, IL 60521

Versar Project No. 2453.002

May 1995

TABLE OF CONTENTS

1.0 INTRODUCTION AND BACKGROUND

1.1 Purpose

This Removal Action Workplan (RAW) was developed to provide final closure of the Pacific Activities Limited (P.A.L) property located at 626 Schmidt Road in Davenport, Iowa. The property location is presented in Figure 1. The industrial property contains lead, cadmium, and nickel in surface soil that may pose a potential risk to human health and the environment.

This RAW is part of an Administrative Order on Consent between USEPA Region 7 and P.A.L. The RAW presents the technical approach and planned execution for final closure of remaining environmental issues.

1.2 Introduction

Historic activities on the property have included operation of a locomotive foundry, machine shops, forges, furnaces, conveyors, offices, and a laboratory. During operation of the locomotive foundry, foundry slag and foundry sand are believed to have been deposited across the property as fill. During Alloy Metal Product, Inc.'s use of the property smelting operations for the production of nickel alloys were conducted. Those operations resulted in the accumulation of dust from a baghouse servicing the primary smelting shop. Baghouse dust was detected at four areas of the property and contained primarily iron and nickel and, in lesser amounts, other metals. The property was purchased by P.A.L. on March 15, 1989 and has generally remained idle since the purchase.

1.3 Property Regulatory History

Between April 17 and 18, 1990, USEPA performed a Compliance Evaluation Inspection (CEI) at the P.A.L. property in response to issues raised by previous owner(s). On January 28, 1991, a Partial Closure Plan was submitted to USEPA by P.A.L. for the purpose of removing the four baghouse dust piles that were stockpiled on the property by Alloy Metal Products, Inc. On July 19, 1991 a RCRA Facility Assessment (RFA) report was issued by USEPA Region 7 in which 27 potential solid waste management units (SWMUs) were identified. The Partial Closure Plan developed by P.A.L. in 1991 was accepted by USEPA's RCRA Branch/Iowa Section on March 9, 1992. In October 1993, USEPA conducted a RCRA Facility Investigation (RFI) across the property, culminating in a report entitled *Revised Sampling Visit Trip Report and Data Compilation, Volumes I and II* and dated February 14,

1994. In late 1993 various materials were removed from the property and building decontamination was conducted by P.A.L.

The RFI conducted by USEPA in December 1993 represents the most comprehensive sampling of soil conducted across the property. It is those data that were used to develop the current closure strategy and determine areas of soil to be managed. Results from the USEPA study indicate that elevated levels of lead, cadmium, and nickel occur in surface and near surface soils across the property. A property map with soil analytical results is presented as Figure 2. Data is summarized as follows:

	Lead	Cadmium	Nickel
Upper Soil Sample Mean	6,254 mg/kg	216 mg/kg	7,297 mg/kg
Lower Soil Sample Mean	989 mg/kg	15.5 mg/kg	564 mg/kg

Upper soil samples were generally collected from ground surface to six inches below grade and lower soil samples were collected from six inches deep to approximately four feet below grade. In general, the elevated levels of metals are detected in the top six to twelve inches of the soil profile. Isolated areas, such as near USEPA soil boring B-17 (see Figure 2 for location), contain soil with elevated metals at deeper depths. Soil boring B-17 appeared to indicate a layer of plastic chips is present. The extent of the plastic chips has been determined by test trenching through that area.

Groundwater has been monitored since 1991 by a series of shallow wells. Historic analytical results from the shallow well system indicate that groundwater has not been adversely impacted by the occurrence of elevated metals in surface soils and, therefore, groundwater remediation is inappropriate for the closure strategy.

1.4 Property Description

The P.A.L. property resides in an industrial area, bounded on the west side by Howard Steel, a new-steel warehouse operation; on the south side by Alter Trading Corporation, a scrap-metal recycling facility; on the east side by Schmidt Road, SOO Railroad tracks, and Rich Battery & Metal Company, another scrap-metal facility; and, commercial buildings along Rockingham Road to the north. East of Schmidt Road are additional warehouses and industrial facilities. The southeast corner of contiguous property is

used as a recycling center for the City of Davenport's recycling program and has limited, controlled public access. A fence and gate separate the recycling center from the remainder of the P.A.L. property. The recycling facility is scheduled to be closed on March 31, 1995 and public access will be eliminated. The property is fenced on four sides and access is gained through two locked gates, one located in the southeast corner and one in the southwest corner.

The property consists of approximately 10.3 acres, consisting of approximately 6.5 acres of gently sloping exposed soil and miscellaneous fill material and approximately 3.75 acres of buildings, reinforced concrete pads, and concrete foundations. The area on the property that is currently open soil and fill will be evaluated for the need of a soil-cement cover. Three buildings (formerly No. 17, 18, and 19) and one covered concrete pad (former building No. 41) remain on the property and will be used for future site operations. Two sets of railroad tracks enter the property from the south side and connect to Buildings No. 17 and 18. The areas to be affected by the closure activities are delineated in Figure 3.

The PAL property is reported to be underlain by Devonian-aged Wapsipinicon Limestone and grey-green shale, lime mud, and sand stringers dating back to the Pennsylvanian age. The bedrock is covered by 8 to 16 feet of unconsolidated overburden that consist of alluvial clay upon which was deposited sand and cinder backfill. The bedrock surface is reported to be uneven.

The unconsolidated overburden immediately overlying bedrock is described as green silty clay to shaley clay at depths ranging from 8 to 16 feet below grade. From 3 to 8 feet below grade is a grey silty clay and black organic clay. From ground surface to approximately 3 feet are black, slag-like sandy fill material. Soil borings advanced across the property over the years have generally not penetrated the bedrock surface.

Groundwater flow in the unconsolidated deposits is generally to the east. The flow direction is based on water levels reported from the existing groundwater monitoring wells on the property. Groundwater flow in the bedrock formation has not been measured at the property but is believed to be toward the east/southeast, in the direction of the Mississippi River. The Mississippi River lies approximately 2,000 feet southeast of the property.

Perched groundwater has been observed in the upper fill material, as this material provides greater permeability than the underlying clays. The perched water is likely the result of infiltrating precipitation. It is unlikely that the perched water migrates through the underlying clays and into the bedrock.

1.5 Building Interiors

There remain on the P.A.L. property two buildings that formerly held residual material from Alloy Metal Products' operations: Building Nos. 17 and 18. Building decontamination has been completed. Building No. 17, used previously as a warehouse, held containerized materials that were removed in September 1993. After the containers were removed and the contents properly disposed off-site, the building floor was cleaned of residual dust.

Building No. 18, formerly used to process material, was also used to store a limited quantity of baghouse dust prior to off-site shipment for secondary metal recovery. Remaining baghouse dust was removed from the building by 1991 for secondary metal recovery. The building was decontaminated in September 1993. Building decontamination consisted of scarifying the concrete floor to a depth of 1/8 inches beneath and around the former baghouse dust storage area, an area encompassing approximately 9,100 square feet. The scarified concrete was vacuumed and contained. The remaining floor areas in building No. 18 were vacuumed twice to remove potential residual dust, with the second vacuuming occurring after the roof-support columns were pressure washed. The roof-support columns in the vicinity of the former baghouse dust pile were pressure-washed at 2.5 psi during two separate decontamination efforts. Wipe testing was used to document the success of decontamination efforts. Scarified material, rinsate fluids, and wooden floor material (from the northeast corner of the building) were properly disposed off-site.

The remaining building, Building No. 19, was formerly used as the power plant for the property and was used to store office furniture and files.

2.0 CLOSURE METHODOLOGY

2.1 Introduction and Removal Action Methodology

The removal action for the elevated metal concentrations on the surface and in near-surface soil will be by application of soil-cement to encapsulate and cap impacted soil that fails to pass the Toxicity Characteristics Leaching Procedure (TCLP) criteria of 5.0 mg/L for lead and 1.0 mg/L for cadmium. Except for roadways and parking lots, the soil-cement cap will then be covered by a topsoil layer for vegetative growth overlying a drainage layer. Additional areas that pass the TCLP criteria may be covered with top soil if elevated total metals concentrations are present above established action levels presented in Section 4.4.1. Roller-compacted concrete will be used for the on-site roadways.

The removal action of the P.A.L. property will consist of solidifying the upper 12 inches of existing soil, thereby creating an impermeable cap across areas of the property that exceed acceptable levels of lead, cadmium, and nickel. Solidification will consist of soil-cement application, with the appropriate binding material as determined by laboratory bench-scale testing during the treatability study. Coverage of adversely impacted areas of the property will assure that potential exposure of humans to metals does not occur in the future and that stormwater is diverted away from the metal-containing material and discharged off-site. Prior to applying the soil-cement, existing soil surfaces will be graded to accommodate stormwater drainage.

2.2 Established Success Criteria for Capped Areas

Success of the solidification/cap will be determined by three criteria: the permeability of the final cover is equal to or less than 10^{-7} cm/sec, the cap thickness is 12 inches or greater, and cap material does not leach lead greater than 5.0 mg/l and cadmium greater than 1.0 mg/l using the multiple extraction procedure.

2.3 Treatability Study

The purpose of the treatability study is to evaluate and select appropriate binders to satisfy the remedial objectives of the project on a bench scale. Impacted soil/binder mixes will be tested by a qualified laboratory to assess conformance to the design criteria for encapsulation of impact soils containing unacceptable levels of metals. Two general types of samples will be collected, one defined as representative of highly impacted soil and one of the sub-surface plastic chip layer. The impacted soil

sample will be collected from an area identified as containing elevated concentrations of lead, cadmium and nickel. This area will be selected based on soil analysis conducted across the property. Different types of site soil material, such as slag, sand, plastic chips, will also be collected for use during the treatability study to ensure reliability of those results and to develop families of performance curves for use in the field. Prior to treatability analysis, the samples will be analyzed for total and TCLP metals to assure sample representativeness when compared to the earlier study by USEPA.

Several binder constituents will be evaluated for their suitability including, portland cement, cement kiln dust (CKD), coal combustion fly ash, lime kiln dust (LKD). Alternative stabilization/reactive additives will also be evaluated, such as sodium silicates and phosphates, should conventional binder constituents prove unsuccessful. It is anticipated that two composites will be prepared by the treatability laboratory, one representing soil, and one case consisting of a composite of soil and plastic chips. The sample to be augmented with a quantity of plastic chips will include plastic chips excavated from the subsurface.

As an initial screening, approximately three soil types, based on grain-size distribution will be evaluated, each at three different dosage levels, for a total of approximately nine stabilized samples. For preliminary evaluation of proper binder content using Type 1 cement, a test procedure developed "Short-Cut Test Procedures for Sandy Soils" may be used, if applicable. This procedure requires a grain-size analysis, a moisture-density test, and a 7-day compressive-strength test. Based on preliminary treatability results, two mixtures (one worst case soil and one soil/plastic chips) will be selected for full performance testing. Full performance testing is a method of reproducing the desire mixture of binders on the appropriate samples for final documentation that the bench-scale test passes the success criteria and will include TCLP lead and cadmium, Multiple Extraction Procedure (MEP) lead and cadmium, permeability, unconfined compressive strength (UCS), and density. Although not a success criteria, UCS and density will be used internally in the field for monitoring the progress of soil-cement placed. Due to a direct correlation between density and permeability, and permeability and leachability by MEP, field measurements of final cap density will also document that the permeability and MEP criteria have been met. At the conclusion of the treatability study, the density relationship to permeability and leachability will be established such that density measurements in the field can be used to infer permeability and leachability, which will allow documentation of cap success without the need to core through the final cap.

2.4 Soil - Cement Field Demonstration

The results of the treatability study will determine the proper ratio of binding agent, water and soil as well as the type of binder to produce the optimum mix, and the appropriate field measurements to document cap performance in relation to the success criteria. In addition to determining the chemical properties of the waste and stabilized material, the treatability study will also determine the physical properties. The next step is to determine the appropriate method to implement the application of soil-cement.

There are two approaches to on-site solidification: mixing the material in-place or excavating the material and mixing it in a pug mill prior to compaction in-place. Knowing the physical properties (e.g.; particle size distribution, bulk density, presence of debris, dustiness, etc.) will help determine whether in-situ or plant mixing method is most appropriate. A field demonstration (pilot study) will be performed to address scale-up factors from the laboratory testing. Field demonstration may include in-situ implementation testing, plant mixing (pug mill) testing, or testing both implementation methods on surface materials representative of the site. The field demonstration will identify problems associated with material handling, equipment selection and sizing, application of the binder, and effectiveness of mixing and curing. Final selection of the method and equipment for applying of the soil-cement cap will be determined by Versar's engineers based on the results and success of the treatability and field demonstration studies. Criteria used to select the final soil-cement application method will include availability of equipment, ability to pass the success criteria, degree of control during application, and cost-effectiveness of the method.

Cured samples during the field demonstration study will be analyzed for the success criteria MEP, permeability, thickness. If the treated material does not pass the success criteria, then additional work will be required to determine the appropriate mixture to achieve the success criteria.

If the in-situ method of soil-cement application is selected, three application alternatives exist:

1. Spread the binder over the surface and till it in using conventional agricultural equipment until binder is thoroughly mixed-in; add water to irrigate the mixture, or till in the water using specialized equipment, to optimum moisture content;

2. Use specialized equipment which simultaneously applies binder, water and mixes it with the contaminated material; such equipment includes the CAT RR-250 Road Reclaimer; or,

3. Spread the binder over the surface and use a travelling pugmill to mix the material and discharge it into winrows.

If plant mixing (pug mill) methodology is selected, material to be processed will require excavation and handling prior to in-place compaction. The plant is equipped with feeding and metering devices that combine the binder, soil, and water in specified quantities. Once the material is mixed in the pug mill, it will be spread and compacted at optimum moisture content. Compaction will be designed to meet specified density requirements. Following initial compaction, the solidified material will be cured to specification.

If plant mixing is selected, dust control measures will be used, as needed, during excavation and mixing activities. Dust control measures will be designed to reduce potential exposure of fugitive dust to workers and other potential receptors.

Once a suitable mix design and application method is established, full-scale stabilization equipment will be mobilized to the site.

2.5 Institutional Controls

2.5.1 Groundwater Monitoring Wells

New monitoring wells will be installed at the perimeter of the property, as presented in Figure 3. One groundwater monitoring well will be located at the hydraulically upgradient end of the property, near the southwest corner, and two downgradient monitoring wells will be located in the southeast corner of the area cap with soil-cement, as shown in Figure 3. Ground water will be monitored for dissolved lead, cadmium, and nickel semiannually at the site for a period of five years. If, after five years of monitoring, no statistically significant increase in lead, cadmium, or nickel is observed in the groundwater, annual monitoring will be implemented for an additional five years. If after the second five-year period no statistically significant increase in lead, cadmium, or nickel is observed in the groundwater, groundwater monitoring wells will be properly abandoned. Details of the monitoring plan will be presented in the final removal action report.

2.5.2 Annual Inspections

Annual site inspections will be performed to ensure the integrity of the cap. Annual inspections will consist of a visual inspection of roadway surfaces for the presence of deterioration and cracking, and the

grass-covered areas for evidence of disturbance, subsidence, or the presence of burrowing animals. Inspection and maintenance of the cap will be performed, as necessary, for a period of 30 years. An inspection plan will be included as part of the final removal action report.

2.5.3 Deed Restrictions

Deed restrictions will be required at the site to ensure that future site use is limited to industrial and commercial purposes. In addition, the effectiveness of the capped areas is dependant upon appropriate use of the property in the future. Activities that may penetrate or disturb the cap system will be restricted.

2.6 Compliance With Applicable or Relevant and Appropriate Requirements (ARARs)

The implemented removal action will comply with the Federal and State ARARs identified in Table 1. Applicable requirements are those state or Federal requirements legally applicable to the designed remedial action. If it is determined that a requirement is not applicable, it may still be relevant or appropriate to site conditions. Requirements are relevant and appropriate if they address problems or situations sufficiently similar to the circumstances of the remedial action, and are well-suited to the site.

TABLE 1. APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS (ARARs)

Standard, Requirement Criterion, or Limitation	Citation	Description	Comments
Iowa Hazardous Substances and Waste Regulations	Chap. 131	Regulation and definition of hazardous substances for identification, transportation, and disposal in Iowa.	If the preferred alternative involves transportation or disposal of hazardous substances, this will be relevant.
Hazardous Materials Transportation Regulations	49 CFR Parts 107, 171 - 177	Regulates transportation of hazardous materials including packaging, labeling and manifesting.	If the preferred alternative involves transportation of hazardous materials off-site, the requirement will be applicable.
SARA 121(c)		Establishes the schedule for USEPA review of closed sites.	
Corrective Action for Solid Waste Management Units	40 CFR Part 264.552	Regulation and definition of CAMU implementation and post-closure care.	Allows placement of material treated ex-situ and requires post-closure monitoring.
Standards Applicable to Preparing Hazardous Wastes for Off-site Disposal	40 CFR 262.20 - .23	Establishes standards for manifesting hazardous wastes.	If RCRA wastes are disposed of off-site, these requirements may be applicable.
Standards Applicable to Transporting Hazardous Wastes	40 CFR 262.30 - .32	Establishes standards for pretransporting hazardous wastes.	If RCRA wastes are disposed off-site, these requirements may be applicable.
Standards Applicable to Containerizing and Storing Hazardous Wastes	40 CFR 262.34(a)(1)-(4) 40 CFR 264.171 - .175, .177 - .178	Establishes standards for staffing hazardous wastes	If RCRA wastes are disposed off-site, these requirements may be applicable.
Applicability of RCRA Requirements (Preamble to the NCP)	40 CFR 300	Defines Areas of Contamination	Allows placement and consolidation of material treated or capped in-situ.
Control of Particulate Matter	Chapter 23 IAC Section 23.3(2)(c)	Establishes criteria for initiating dust control	If site activities create a dust nuisance or adjacent properties, control measures must be implemented.

3.0 PROJECT MANAGEMENT AND SCHEDULE

3.1 Project Schedule

The schedule in Figure 4 is presented as an optimum case providing that factors influencing the outcome of the work proceed as planned. The duration of the pilot study, and subsequently the removal action activities, could be shortened or lengthened depending on the outcome of the laboratory treatability study.

There are factors which may act on the schedule that, at present, cannot be predicted. Such factors include weather and time necessary to review documents (Work Plan, Health and Safety Plan), comment on the documents, and respond to comments on the documents. Conservative estimates to complete individual tasks were used to develop the schedule presented in Figure 4. Activities involving application of soil-cement are preferred to be conducted in weather that is no cooler than 40 degrees fahrenheit (average), but can be conducted in cooler temperatures, if necessary.

In addition to scheduled removal action activities, other milestones and documents required are:

- Submit Health and Safety Plan within thirty days after effective date of Consent Order;
- Identify Project Coordinator within five days after effective date of Consent Order;
- Identify the prime Contractor within 21 days after effective date of Consent Order; and,
- Submit weekly progress reports every Wednesday, beginning the second full week after effective date of Consent Order.

3.2 Project Management

The project organization chart in Figure 5 presents the responsibilities of project personnel for the site removal action. The USEPA Project Coordinator has overall responsibility for assuring compliance of the removal action with the Consent Order. The Versar Project Manager has the responsibility for ensuring that the project meets USEPA objectives, and Versar's technical and quality standards. In addition, the Versar Project Manager is responsible for implementing the removal action, and has the authority to commit the necessary Versar resources to meet project objectives and requirements.

4.0 SAMPLING AND ANALYSIS PLAN

4.1 Introduction

Extensive sampling and analysis has occurred across the P.A.L. property. Additional exploration sampling will be used to delineate areas of surface soil across the property exceeding acceptable levels of lead, cadmium, and nickel. Subsequent sampling and analysis will be limited to defining areas for removal action activities and appropriate field testing of the final soil-cement cap to assure that the cap meets specification.

4.2 Plastic Chips Delineation

The extent of plastic chips observed in USEPA boring B-17 has been delineated by intrusive exploration. Delineation was made by visual observation of plastic chips in the field and did not include laboratory analysis. The area identified as containing buried plastic chip is presented in Figure 6. The approximate volume of plastic chips and soil beneath the top twelve inches of soil is estimated to be 600 cubic yards. Plastic chip samples have been collected for use during the treatability study, as discussed in Section 2.2 of this workplan.

4.3 Metals Contamination Delineation in Soil

Results of the soil sampling program conducted by USEPA in October 1993 lead to the tentative conclusion that the majority of soils on the P.A.L. property should be included in this remedy response. Subsequent sampling has raised doubts about this tentative conclusion. To avoid the costs associated with implementing the removal action unnecessarily across the property, a sampling and analysis program will be implemented to identify the specific contiguous surface areas of impaired soil. Areas not currently covered by buildings, concrete pads/structures pavement, or railroad tracks will be included in the study.

4.4 Sampling and Analysis Plan

The design steps for selecting field sampling methodology and data analyses for the P.A.L. site are as follows:

1. Define the sampling zone and variables of interest.
2. Define a general sample collection strategy.
3. Develop a statistical model and statistical sampling objectives for each sampling zone.

4. Specify the estimation and/or testing procedures to be employed and their desired statistical properties.
5. Select the sampling design parameters to achieve the desired statistical properties.

4.4.1 Sampling Zone and Variables of Interest

The sampling zone is defined as the top 12 inches of exposed (not covered) soil across the property. The area to be sampled for delineating the need for removal action is projected to cover approximately 11,000 square yards. The initial variables of interest include total lead, cadmium and nickel. Targeted initial action levels are 1,320 mg/kg for lead, 110 mg/kg for cadmium, and 7,000 mg/kg for nickel. Once the initial total levels for lead, cadmium, and nickel are known, the decision tree presented in Figure 7 will be used to delineate areas for management by soil cover or soil-cement application. Areas exhibiting TCLP results greater than 5.0 mg/L for lead, 1.0 mg/L for cadmium, and 40 mg/L for nickel will receive soil-cement.

4.4.2 Sampling Program for Delineating Areas Requiring Removal Action

The objective of conducting a site-wide sampling and analysis program is to identify areas failing the acceptance criteria (industrial remediation goals) for total lead, cadmium, and nickel. Areas delineated as needing removal action will subsequently be sampled for the treatability study and will be included in the removal action activities.

A representative soil sampling program, as recommended in OSWER Directive 9360.4-10 dated November 1991, will be used to ensure that the samples analyzed accurately reflect site conditions. The sampling program selected for the site is referred to as a Systematic-Random Sampling scheme. The sampling program will be based on dividing the site into equal-sized sampling areas measuring fifty feet by fifty feet. The sampling areas will be defined by placing a grid with fifty-foot spacing in either direction over the site. Each fifty by fifty-foot grid block (sampling area) represents less than one percent of the total exposed soil on the property. The sampling areas are presented in Figure 8. To select the sampling point from within each grid block, each fifty by fifty foot grid block will be further divided into 25 mini-grids, each measuring five feet by five feet. An example of the mini-grid within each grid block is presented on Figure 8, grid-block "J10". A sample location from one mini-grid will be randomly selected using a random-number generator program. The sample will be collected from the center of the randomly selected mini-grid. The mini-grids randomly selected for each grid block are shown in Figure 9. For partial grids located along the border of the site, some randomly-selected mini-grids do

not fall on the property and would not be sampled. The results of total and TCLP metal analysis shall determine the appropriate level of action to be conducted within that fifty by fifty-foot grid.

4.4.3 Soil Sample Collection Methodology

Surface soil samples will be collected from mini-grids using hand-held equipment, such as stainless-steel scoops. Grid lines will be laid out by transit and stadia. Sampling equipment will be thoroughly decontaminated with surfactant and water between sampling locations. Decontaminated stainless-steel mixing bowls will be used to mix samples prior to containerizing or prior to splitting with the Agency's representative.

Soil samples will be collected from ground surface to 12 inches in order to represent the soil to be incorporated into the removal action cap. At each sample location, large (greater than 2 inches in diameter or length) material/debris will be removed from the material retained for analysis. Samples will be numbered according to their positions within the grid-block numbering system in Figure 8. One 8-ounce soil sample will be collected from each sampling location. Split samples will be made available to USEPA or their representative. Splitting will be conducted as described in OSWER Directive 9260.4-10, November 1991.

Upon containerizing the sample retained for analysis in laboratory-provided glass jars, the samples will be preserved in accordance with requirements in SW-846. Samples will be analyzed for total lead, cadmium and nickel by USEPA approved Method 6010. Extractions for TCLP analysis will be consistent with USEPA approved Method 1311. The appropriate number of rinsate blanks, matrix spike samples, filed and trip blanks, and duplicate samples will be submitted and analyzed to assure the quality control and assurance during execution of the sampling and analysis plan. Project quality control will be maintained by adhering guidance presented in USEPA's *Quality Assurance / Quality Control Guidance for Removal Actions* (EPA/540/G-90/004) dated April 1990.

The property will be divided based on the remediation goals presented in Section 4.4.1, into areas in need of removal action and areas that need no further action.

4.4.4 Statistical Sampling Objectives for the Soil-Cement Cap

The general sample collection strategy for the soil-cement cap is to obtain measurements in the field that provide data to accurately characterize the soil-cement cap conditions. Based on the methods which will be employed to construct the cap, measurements will be made during soil excavation or mixing and frequent density measurements after soil-cement compaction. Density measurements, as discussed in Section 2.3, will document that the permeability and leachability success criteria have been met.

The cap success criteria are presented in Section 2.2. The objective of the final cap sampling program is to establish the following:

- The soil to be incorporated into the soil-cement cap has a minimum thickness of 12 inches or greater;
- The soil-cement cap does not exceed 5.0 milligrams per liter (mg/l) and 1.0 mg/l for extractable lead and cadmium, respectively; and,
- The soil-cement cap has a minimum permeability of 10^{-7} cm/sec or less.

Suggested guidelines for developing data quality objectives for removal actions are a confidence level of 90 to 95 % and power (1-β) of 90 to 95% (EPA, March 1989).

4.4.5 Statistical Model

The normal distribution model will be used to describe the sampling distribution of measured values of density, thereby providing the distribution of permeability. The sampling population will be greater than 30. Acceptance of the final cap will be achieved based on compliance with cap specifications, as determined by testing the following null (H_0) and alternative (H_A) hypothesis:

H_0: Density of the cap is > or = the density established by the treatability study
H_A: Density of the cap is < the density established by the treatability study

Success or failure of the one-tailed tests will be based on the Type I error (α) equal to or less than 0.05, and the power of the statistical test (1-β) equal to or greater than 0. 90.

4.4.6 Testing Procedures

Thickness of the soil to be incorporated into the soil-cement cap will be measured during excavation (for a pug mill) or during mixing (for in-situ treatment). Measurements will be made by setting a laser level to the appropriate depth and using heat instrument to guide the excavating equipment. In areas where uneven ground is encountered due to sloping for drainage, the 12-inch minimum thickness will be set for the down-slope end of the working section. This method of establishing depth will assure that the minimum thickness criterium is met.

To verify soil-cement effectiveness, samples of the soil cement will be measured frequently for density for each "section" of soil-cement applied, as discussed in Section 2.3. Should density readings fail to reach that established by the treatability study for the soil types on the property, additional compaction will be required. Density will be measured by a nuclear gauge and the instrument will be used by a trained operator. Laboratory tests required during the treatability study to verify effectiveness of the soil-cement recipe include the Multiple Extraction Procedure (EPA SW846 Method 1320) and the Constant-Head Permeability Test (ASTM Standards) to assure the success criteria are met. Results of the treatability study will be submitted to USEPA within two weeks of being finalized.

4.5 Air Testing During Construction

Air monitoring will be performed continuously during closure activities, as follows:

- Oversight personnel will routinely check for visual evidence of dust present in the air from closure activities;
- Real-time dust monitoring pumps (mini-rams) will be used at work locations around the property, with an action level of 150 μg/cubic meter above measured background. Measured background will be established each morning and mid-day, prior to site activities being initiated in the morning and afternoon, respectively.
- High-volume air samplers will be used to provide total particulate data as back-up for real-time monitoring data provided by the mini-rams. Two high-volume samplers will be used at the property perimeters, one upgradient and one downgradient based on prevailing wind direction. The sampling equipment will be checked and calibrated daily.

If work area dust levels exceed the action level established after adjusting for background levels, dust control measures will be implemented to reduce the potential for worker exposure and for dust migration off the property.

5.0 REMOVAL ACTION ACTIVITIES

5.1 Subsurface Removal Action

The extent of plastic chips, as delineated by trenching, will form the basis for developing a plan for excavation and removal of these areas. It is anticipated that removal will consist of excavation using conventional heavy equipment and placement of the contaminated media in a stock-pile for subsequent processing. Depending on the size of the material to be treated and criteria established by Versar engineers at the time of placement method selection, the media may be screened and/or crushed to size to permit direct solidification or incorporation into site soil for solidification. The handling of excavated material will include the options of (1) treating the plastic chips by solidification and placing the treated material into the excavation; (2) treating the plastic chips by incorporation into soil-cement which will then be either placed into the excavation or used as the surface cap; or (3) treating the plastic chips and disposing of the treated material off-site in an appropriate landfill. Excavated areas will be filled-in with material compacted in specified lift thicknesses.

5.2 Surface Contouring

At present, the site is essentially flat with little direct drainage controls. Grading of surface soils will produce the necessary elevations for drainage and improve the effectiveness of the cap. Grading of the site will include cut-and-fill operations and development of berms and swales. Special attention shall be paid to minimizing the amount of grading of "hot spots" in the surface soils which have been identified as containing metals exceeding the remediation goals for total lead, cadmium, and nickel. If excessive grading is necessary in these areas, surface material may be stock-piled separately and re-spread once grading is complete to assure the material is included in the solidification layer. If isolated areas of material are identified during the property-wide sampling and analysis program, consolidation of surface material will incorporate these areas into a single area to receive soil-cement.

5.3 Soil Solidification

Once surface contours have been established, soils will be solidified to a minimum depth of 12 inches below graded soil surface. This thickness does not account for the final solidification thickness in areas that encounter material other than surface soil that will be incorporated into the final cap. As previously stated, the solidification will occur by using either in-situ or on-site plant methods, which will be determined as a result of the treatability study and field demonstration. The solidification layer will be

designed with sufficient strength to support the overlying materials and anticipated loads on those materials. Verification measurements of density will be collected during the course of the project to assure the success criterium for permeability are achieved.

5.4 Property Utilities

Service to all existing utilities will be properly disconnected, but the lines will remain in the ground unless they interfere with construction activities. Future utility needs will be serviced through overhead lines or an established utility corridor at the north end of Building No. 18, so as not to breach the cap.

5.5 Property Restoration

The areas delineated as containing metals concentrations above the action levels established in Section 4.4.1 will be covered with 12 inches or more of top soil or soil-cement. Non-traffic areas that have received soil-cement will receive a six-inch thick drainage layer and six inches of soil cover. Grass will be established and maintained within these areas. A six-inch thick layer of roller compacted concrete will be placed over the solidification layer for use as site roads. Cover materials will be placed such that the solidified layer is not directly exposed. Figures 10 and 11 present cross-sections of final cap configuration for on-site roadways and railroad spurs, respectively, in areas requiring an impermeable soil-cement cap. Once the soil-cement has cured, an asphalt coating will be applied to areas of soil-cement exposed in swales. The asphalt coating will protect the soil-cement from erosion, improve protection for stormwater infiltration, and be easily repaired if coating cracks or other damage occurs.

6.0 FINAL REPORT

A final report will be submitted within sixty days after completing field activities, including site restoration. The final report shall include:

- A summary of closure activities
- Estimated or final closure costs
- Quantities of material managed
- Destination of hazardous material removed from site
- Analytical results collected during closure activities
- Relevant documentation generated during removal action.
- Cap Inspection and Groundwater Monitoring Plan

7.0 ESTIMATED MAXIMUM REMOVAL ACTION COSTS

Costs to complete the necessary preliminary tasks, conduct removal action, and generate a final report are estimated to be:

	Expected Costs ($)
Conduct treatability study and field demonstration	54,500.00
Develop bidding specifications and select contractor	30,000.00
Conduct removal action	*630,000.00
Generate final report	18,000.00
Present value for long-term monitoring	78,500.00
Subtotal	811,000.00
Contingency	50,000.00
Estimated Project Total	861,000.00

726,500

* Estimated price assumes a percentage reduction in areas required to have soil-cement, top soil cover only, and no further action, based on existing data. Price includes costs for conducting site-wide sampling and analysis.

APPENDIX B

REMOVAL ACTION PROGRESS REPORTS
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

Versar INC.

July 5, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

Re: Progress Report 6/19 to 6/30 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

On June 18, 1996 Versar, Inc. and Envirocon, Inc. commenced with remedial activities at the Pacific Activities Limited (PAL) site located at 626 Schmidt Road in Davenport, Iowa. Versar has prepared this progress report for the period of June 18 to June 30. The progress report has been prepared in accordance with instructions provided in the USEPA's consent order to Pacific Activities Limited dated June 6, 1996.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 7/1 to 7/14.

WORK COMPLETED - 6/18 to 6/30

Remedial action is to include either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

MIDWEST REGIONAL OFFICE • Green Brook Executive Center • 200 West 22nd Street • Suite 250 • Lombard • Illinois 60148
Telephone: (708) 268-8555 • FAX: (708) 268-0555

Table 1

TASK	% COMPLETE
Mobilization	85%
Site Preparation	85%
Excavation of Soil/Cement Grids	20%
Backfill of Soil/Cement Grids	0%
Preparation of Cover Soil Grids	0%
Backfill of Cover Soil Grids	0%
Utility Trenches	0%
Berm Construction	0%
Berm Drainage, Cover & Fencing	0%
Seeding and Mulching	0%
Demobilization	0%

During the work period the following activities were performed.

6/18 Project Start Up Meeting

6/18 - 6/21 Baseline Air Monitoring

6/18 - 6/20 Site Pre-Construction Site Survey and Decon Area

6/21 - 6/27 Site and Berm Preparation (Including: grubbing, clearing, segregation of debris from piles, and stockpiling of soil and debris from piles)

6/27 Excavate Soil/Cement Grids 36 & 38

6/28 Excavate Soil/Cement Grids 35, 37 and 57.

Soil excavated from Soil/Cement Grid #57 contained approximately 75% casing fragments by volume. Excavation averaged 18 inches in depth and was extended to Soil Cover Grid #13 and to a no further action grid to the south.

6/29 Excavated Soil/Cement Grids 57, 58 and 59. Finish Grading and Compacting Berm Construction Area and Drainage Ditch

RESULTS OF SAMPLING AND TEST DATA

Baseline and actual perimeter air monitoring data are provided in Table 2, while excavation quantities for soil/cement grid areas are provided in Table 3.

Soil and debris collected from piles originally located at various locations at the site have been stockpiled for treatment. Soil collected from the piles is estimated to be1,000 cubic yards. Debris is estimated to be on the order of 700 cubic yards. The debris stockpile consists of concrete, scrap metal, slag, and wood.

Table 2 - Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18	NS	0.014
6/19	0.051	0.031
6/20	0.125	0.049
6/21	0.711	0.434
6/22		
6/24		
6/25		
6/26		
6/27		
6/28		
6/29		

PLANNED WORK ACTIVITIES

The following work activites are planned for the period of 7/1 to 7/7.

- Excavation of soil/cement grid areas and site preparation to be complete by 7/7.
- Geotextile to be delivered and placement onto soil cover areas to start on 7/9.
- Backfill of excavated soil/cement grids and cover soil grids to start on 7/3.
- Screening plant and truck scales to be delivered, setup and soil screening to start on 7/5.

The following work activites are planned for the period of 7/8 to 7/14.

- Excavation and backfill of grids on western half of site (Building 18 area) to be finished by 7/8. Site exclusion zone to be reduced to allow limited access to Building 18 for scheduled construction.

Table 3 - Soil/Cement Grid Quantities

Grid #	Location	Qty (Yd^3)
35	F,12	26.12
36	F,13	102.96
37	G,12	42.59
38	I,12	74.07
57	L,4	

- Mount Carmel Sand & Gravel, soil stabilization contractor to Envirocon, scheduled to be on site 7/9. Soil stabilization to start on 7/10.
- Continue with backfill of soil/cement grids and placement of geotextile and cover of soil cover areas to continue.
- Inspection will include continuation of perimeter and worker dust sampling, survey of excavated grids, and compaction testing of backfill and soil/cement.

The projected finish date for remediation is August 2, 1996.

If you have questions with regard to this information, please call Mr. Mike Place at 708/268-8555 or myself at 319/328-3621.

Sincerely,

M. Dean Jones, Jr.
Construction Manager

cc: Mr. Mike Place - Versar, Inc.
Mr. Jeff Goldstien - Alter Trading Co.
Mr. Jeff Brown - Envirocon, Inc.

NO2453005/PR1.mdj

Versar INC.

July 10, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

RE: Progress Report 6/24 to 7/7 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of June 24 to July 7. The progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 7/1 to 7/14.

WORK COMPLETED - 6/24 to 7/7

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

During the work period the following activities were performed.

6/24 - 7/3 Site and Berm Preparation (Including: grubbing, clearing, segregation of debris from piles, and stockpiling of soil and debris from piles).

6/27 Excavate Soil/Cement Grids 36 and 38.

6/28 Excavated Soil/Cement Grids 35, 37, and 57.

Soil excavated from Soil/Cement Grid #57 contained approximately 75% casing fragments by volume. Excavation averaged 18 inches in depth and was extended into Soil Cover Grid #13 and to a no further action grid to the south. Excavation was conducted as needed to remove casing fragments.

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6/29 Excavated Soil/Cement Grids 57, 58, and 59. Finish Grading and Compacting Berm Construction Area and Drainage Ditch.

7/1 Excavated Soil/Cement Grids 1, 2, 3, 55, and 56.

7/2 Excavated Soil/Cement Grids 4, 5, 7, and 8.

7/3 Excavated Soil/Cement Grids 6, 17, 18, 19, 20, 21, 22, 23, 26, 31, 32, and 34.

Soil Cement Grids 1, 2, 3, 4, and 59 were backfilled with Iowa DOT Gradation No. 11 crushed stone and compacted.

7/4 No Work - 4th of July Holiday.

7/5 Excavated Soil/Cement Grids 25, 26, 27, 28, 29, 30, 31, 33, 40, 42, 43, 44, and 45. Battery casing fragments were encountered in Grids 39, 40, 41, 42, 43, 44, and 45.

Casing fragments ranged in size from less than an inch to near full-size battery casings. Fragment layers were 6 to 12 inches thick and were covered with a foot of miscellaneous fill. Excavation depths ranged from two to three feet to remove the casings fragments.

Material screening and shredding plant on site.

7/6 Excavated Soil/Cement Grids 46, 47, 48, and 49. Casing fragments were encountered in these grids. Excavation depths ranged from two to three feet to remove the casing fragments.

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	95 %
Backfill of Soil/Cement Grids	10 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	0 %
Utility Trenches	0 %
Berm Construction	0 %
Berm Drainage, Cover & Fencing	0 %
Seeding and Mulching	0 %
Demobilization	0 %

RESULTS OF SAMPLING AND TEST DATA

Baseline and actual perimeter air monitoring data are provided in Table 2, and excavation quantities for soil/cement grid areas are provided in Table 3.

Table 2
Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/24	NS	0.014
6/25	0.051	0.031
6/26	0.125	0.049

PLANNED WORK ACTIVITIES

The following work activities are planned for the period of 7/8 to 7/14.

- Continue with excavating and backfilling soil/cement grids; placing geotextile and crushed stone in soil cover grid areas; and start with screening and processing stockpiled soil for stabilization.

Table 3 - Soil/Cement Grid Quantities

Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)
1	K,1	67.59	21	B,11	56.30	41		
2	J,1	70.93	22	B,10	52.22	42		
3	I,1	88.70	23	C,9	84.81	43		
4	F,1	116.11	24	C,10	86.67	44		
5	E,1	131.42	25	C,11	102.22	45		
6	E-D,.5	99.35	26			46		
7	B,.5	48.32	27	D,8	26.69	47		
8	A.5,1	73.03	28	D,9	84.44	48		
9	A.5,2	49.97	29	D,10	73.33	49		
10	A.5,3	50.37	30			50		
11	A.5,4	52.76	31			51		
12	A.5,5	50.09	32			52		
13	A.5,6	42.35	33			53		
14	A.5,7	32.08	34	C,12	12.50	54	J,4	149.96
15	A.5,8	28.24	35	F,12	26.12	55		
16	A.5,9	53.70	36	F,13	102.96	56	J,3	70.93
17	A,9	58.64	37	G,12	42.59	57	L,4	28.33
18	A,10	76.23	38	I,12	74.07	58	L,3	105.69
19	B,9	76.48	39			59	L,2	52.78
20	B,10	52.22	40			60		
13*	K,4	52.67	**	M,4	28.84			

- Soil stabilization is expected to start on 7/10.
- Truck scales to be delivered, setup and soil screening to start on 7/9.
- Inspection will include continuation of perimeter and worker dust sampling, survey of excavated grids, and compaction testing of backfill and soil/cement.

The following work activities are planned for the period of 7/15 to 7/21.

- Continue backfilling soil/cement grids; placing geotextile and crushed stone in soil cover grid areas; screening and stabilizing soil/berm construction.
- Inspection will include continuation of perimeter and worker dust sampling, survey of excavated grids, and compaction testing of backfill and soil/cement.

The projected finish date for remediation is August 2, 1996. The project is currently on schedule.

If you have questions with regard to this information, please call me at 708/268-8555 or Dean Jones at 319/328-3621.

Sincerely,

Michael Place
Division Manager
Environmental Assessments

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

Versar INC.

July 17, 1996

Post-it® Fax Note 7671	Date 7/17/96	# of pages ▶ 5
To Dean Jones	From Place	
Co./Dept. * make copy	Co.	
Phone # for J. Brown	Phone #	
Fax # 319-328-3625	Fax #	

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas. 66101

RE: Progress Report 7/1 to 7/14 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of July 1 to July 14. The progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 7/15 to 7/28.

WORK COMPLETED - 7/15 to 7/28

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

During the work period the following activities were performed.

7/1 Excavated Soil/Cement Grids 1, 2, 3, 55, and 56.

7/2 Excavated Soil/Cement Grids 4, 5, 7, and 8.

7/3 Excavated Soil/Cement Grids 6, 17, 18, 19, 20, 21, 22, 23, 26, 31, 32, and 34.

Soil Cement Grids 1, 2, 3, 4, and 59 were backfilled with Iowa DOT Gradation No. 11 crushed stone and compacted.

7/4 No Work - 4th of July Holiday.

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Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

July 17, 1996
Page 2

7/5 Excavated Soil/Cement Grids 25, 26, 27, 28, 29, 30, 31, 33, 40, 42, 43, 44, and 45. Battery casing fragments were encountered in Grids 39, 40, 41, 42, 43, 44, and 45.

Casing fragments ranged in size from less than an inch to near full-size battery casings. Fragment layers were 6 to 12 inches thick and were covered with a foot of miscellaneous fill. Excavation depths ranged from two to three feet to remove the casings fragments.

Material screening and shredding plant on site.

7/6 Excavated Soil/Cement Grids 46, 47, 48, and 49. Casing fragments were encountered in these grids. Excavation depths ranged from two to three feet to remove the casing fragments.

7/8 Finished excavation of battery chips in "No Further Action" grids located at M,8 and O,8. Soil/cement grid excavation is complete.. Soil/Cement Grids 19 through 33 are backfilled and compacted.

Geotextile is placed on Soil Cover Grids 1 and 6

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	100 %
Backfill of Soil/Cement Grids	100 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	50 %
Utility Trenches	0 %
Berm Construction	0 %
Berm Drainage, Cover & Fencing	0 %
Seeding and Mulching	0 %
Demobilization	0 %

7/10 Soil/Cement Grids 34 and 51 through 58 are backfilled and compacted. Soil Cover Grids 4, 5, 9 and 10 are two to three feet higher in elevation than surrounding grade and the floor slab elevation of Building 41. The area was excavated to a lower elevation with the excavated soil used to backfill Soil/Cement Grids 39 through 49 to depth of one foot below finished grade.

Geotextile is place on Soil Cover Grids 1, 3, 8, 12, 14, 15, 19, and 20.

Truck scales delivered and setup.

Versar INC.

7/11 Soil/Cement Grids 39 through 49 backfilled and compacted.

Geotextile is placed on Soil Cover Grids 4, 5, 9, 10, 18, 22, 23, and 25. "No Further Action" Grid at location M,3 was also covered with backfill.

7/12 Screened and stockpiled soil for incorporation into berm.

Secured site with fencing, cleanup and finished miscellaneous tasks.

Heavy rain shut down operaiton about 1:00 p.m.

7/13 Screened and stockpiled soil for incorporation into berm.

Cleaned-up site and finished miscellaneous tasks.

Table 2
Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18	NS	0.014
6/19	0.051	0.031
6/20	0.125	0.049
6/21	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
6/27	0.409	0.284
6/28	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059
7/8	0.910	0.158

* Background dust sample

RESULTS OF SAMPLING AND TEST DATA

Baseline and actual perimeter air monitoring data are provided in Table 2, and excavation quantities for soil/cement grid areas are provided in Table 3.

PLANNED WORK ACTIVITIES

The following work activities are planned for the period of 7/8 to 7/14.

- Screening and processing stockpiled soil for stabilization.
- Soil stabilization is expected to start on 7/17. Work will include screening, placing, mixing and compacting stabilized soil/cement into berm.
- Inspection will include continuation of perimeter and worker dust sampling, compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior, during, and after stabilization, and measurement of lift thickness.

Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

July 17, 1996
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Table 3
Soil/Cement Grid Quantities

Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)
1	K,1	67.59	21	B,11	56.30	41	N,8	136.11
2	J,1	70.93	22	B,10	52.22	42	N,7	230.56
3	I,1	88.70	23	C,9	84.81	43	N,6	220.56
4	F,1	116.11	24	C,10	86.67	44	M,7	225.74
5	E,1	131.42	25	C,11	102.22	45	M,6	152.04
6	E-D,.5	99.35	26	C,12	12.50	46	L,7	256.67
7	B,.5	48.32	27	D,8	26.69	47	L,6	106.67
8	A.5,1	73.03	28	D,9	84.44	48	K,7	177.16
9	A.5,2	49.97	29	D,10	73.33	49	K,6	83.29
10	A.5,3	50.37	30	D,11		50	L,5	51.09
11	A.5,4	52.76	31	D,12		51	K,5	49.19
12	A.5,5	50.09	32	D,13		52	J,5	147.07
13	A.5,6	42.35	33	E,10		53	I,6	55.00
14	A.5,7	32.08	34	C,12	12.50	54	H,6	149.96
15	A.5,8	28.24	35	F,12	26.12	55	J,4	149.96
16	A.5,9	53.70	36	F,13	102.96	56	J,3	70.93
17	A,9	58.64	37	G,12	42.59	57	L,4	28.33
18	A,10	76.23	38	I,12	74.07	58	L,3	105.69
19	B,9	76.48	39	0,7	192.82	59	L,2	52.78
20	B,10	52.22	40	0,6	231.11	60		
Non Soil/Cement Grids Excavated								
13*	K,4	52.67	**	M,4	28.84			

Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

July 17, 1996
Page 5

The following work activities are planned for the period of 7/22 to 7/28.

- Continue soil stabilization including placing, mixing and compacting stabilized soil/cement into berm.
- Inspection will include continuation of perimeter and worker dust sampling, compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior, during, and after stabilization, and measurement of lift thickness.

The projected finish date for remediation is August 9, 1996. The project is currently running one week over the originally projected schedule.

If you have questions with regard to this information, please call me at 708/268-8555 or Dean Jones at 319/328-3621.

Sincerely,

Michael Place
Manager, Environmental
Assessments Group

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

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Versar INC.

July 26, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

RE: Progress Report 7/8 to 7/21 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of July 8 to July 21. The progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 7/22 to 8/5.

WORK COMPLETED - 7/8 to 7/21

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	100 %
Backfill of Soil/Cement Grids	100 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	50 %
Utility Trenches	30 %
Berm Construction	30 %
Berm Drainage, Cover & Fencing	0 %
Seeding and Mulching	0 %

During the work period the following activities were performed.

7/8 Excavated Soil/Cement Grids 39, 40, 41, 52, 53 and 54 and backfilled Grids 4 through 19.

7/9 Finished excavation of battery chips in "No Further Action" grids located at M,8 and O,8. Soil/cement grid excavation is complete. Soil/Cement Grids 19 through 33 are backfilled and compacted.

MIDWEST REGIONAL OFFICE • Green Brook Executive Center • 200 West 22nd Street • Suite 250 • Lombard • Illinois 60148
Telephone: (708) 268-8555 • FAX: (708) 268-0555

Geotextile is placed on Soil Cover Grids 1 and 6.

7/10 Soil/Cement Grids 34 and 51 through 58 are backfilled and compacted. Soil Cover Grids 4, 5, 9 and 10 are two to three feet higher in elevation than surrounding grade and the floor slab elevation of Building 41. The area was excavated to a lower elevation with the excavated soil used to backfill Soil/Cement Grids 39 through 49 to depth of one foot below finished grade.

Geotextile is place on Soil Cover Grids 1, 3, 8, 12, 14, 15, 19, and 20.

Truck scales delivered and setup.

7/11. Soil/Cement Grids 39 through 49 backfilled and compacted.

Geotextile is placed on Soil Cover Grids 4, 5, 9, 10, 18, 22, 23, and 25. "No Further Action" Grid at location M,3 was also covered with backfill.

7/12 Screened and stockpiled soil for incorporation into berm.

Secured site with fencing, cleaned up and finished miscellaneous tasks.

Heavy rain shut down operation about 1:00 p.m.

7/13 Screened and stockpiled soil for incorporation into berm.

Cleaned up site and finished miscellaneous tasks.

7/15 On-site progress meeting. Attendees include:

Mr. Jeff Weatherford - USEPA
Mr. Michael Place - Versar, Inc.
Mr. Dean Jones - Versar, Inc.
Ms. Susan Rossi - Versar, Inc.
Mr. Dick Schaffer - Envirocon, Inc.

Discussed project activities completed to date and planned activities to finish the project, prior to walking the site. After walking the site, discussion focused on the final disposition of the surface debris collected during site preparation. It was agreed that surface debris could be disposed of off-site as construction debris, pending approval of the landfill.

Survey crew delineated berm for placement of soil.

7/16 Patrick Engineering on-site to start compaction testing of backfill and soil/cement.

Soil stabilization equipment mobilized to site.

Started placement of Berm Lift No. 1.

Material screening continued.

7/17 Keith Krambeck of Scott Area Solid Waste Management Commission on-site to observe construction debris. It was decided that the debris could be disposed of as construction debris, without soil.

Placement of the soil/cement berm first lift completed. Due to uneven terrain, lift thickness measurements indicated that lift ranged in thickness from 5 to 14 inches in depth. Areas which measured greater than nine inches were cut to nine inches and reagents for Lift No. 1 were placed and mixed based on a nine-inch lift.

Material screening continued.

7/18 Berm Lift No. 1 was mixed and compacted. Compaction results indicated that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Started placement of Berm Lift No. 2. Fill was placed in three longitudinal passes to facilitate more efficient use of personnel during construction. The berm lift was placed in a 12-inch loose lift.

Material screening continuing.

Excavated utility trench (117 linear feet) for gas line on north side of Building 18.

7/19 Berm Lift No. 2 was mixed and compacted. Compaction testing from the surface and mid-depth of the lift indicate that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Material screening continuing.

7/20 Berm Lift No. 2 was mixed and compacted to completion. Compaction testing from the surface and mid-depth of the lift indicate that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Berm Lift No. 3 was placed in a 12-inch lift. The center pass included 6 inches of oversized material placed with 6 inches of soil.

RESULTS OF SAMPLING AND TEST DATA

The following test data are attached to this letter report.

Table 2 - Baseline and Actual Perimeter Air Monitoring Data,

Table 3 - Final Excavation Quantities, and

Attachment 1 - Compaction Results from the Week of July 15 to July 20.

The following work activities are planned for the period of July 29 to August 5.

- Finish soil stabilization of stabilized soil/cement into berm.
- Placement and cover of geotextile in the Soil Cover Grid Areas.
- Install fencing around berm and construct berm drainage and cover layers.
- Continue inspection including continuation of perimeter and worker dust sampling, compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior, during and after stabilization, and measurement of lift thickness.

The projected finish date for remediation is August 9, 1996. The project is currently consistent with the revised schedule.

Table 2
Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18	NS	0.014
6/19	0.051	0.031
6/20	0.125	0.049
6/21	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
6/27	0.409	0.284
6/28	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059
7/8	0.910	0.158

Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

July 25, 1996
Page 5

Table 3
Soil/Cement Grid Quantities

Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)	Grid #	Location	Qty (Yd^3)
1	K,1	67.59	21	B,11	56.30	41	N,8	136.11
2	J,1	70.93	22	B,10	52.22	42	N,7	230.56
3	I,1	88.70	23	C,9	84.81	43	N,6	220.56
4	F,1	116.11	24	C,10	86.67	44	M,7	225.74
5	E,1	131.42	25	C,11	102.22	45	M,6	152.04
6	E-D,.5	99.35	26	C,12	12.50	46	L,7	256.67
7	B,.5	48.32	27	D,8	26.69	47	L,6	106.67
8	A.5,1	73.03	28	D,9	84.44	48	K,7	177.16
9	A.5,2	49.97	29	D,10	73.33	49	K,6	83.29
10	A.5,3	50.37	30	D,11		50	L,5	51.09
11	A.5,4	52.76	31	D,12		51	K,5	49.19
12	A.5,5	50.09	32	D,13		52	J,5	147.07
13	A.5,6	42.35	33	E,10		53	I,6	55.00
14	A.5,7	32.08	34	C,12	12.50	54	H,6	149.96
15	A.5,8	28.24	35	F,12	26.12	55	J,4	149.96
16	A.5,9	53.70	36	F,13	102.96	56	J,3	70.93
17	A,9	58.64	37	G,12	42.59	57	L,4	28.33
18	A,10	76.23	38	I,12	74.07	58	L,3	105.69
19	B,9	76.48	39	0,7	192.82	59	L,2	52.78
20	B,10	52.22	40	0,6	231.11	60		
Non Soil/Cement Grids Excavated								
13*	K,4	52.67	**	M,4	28.84			

Versar INC.

PLANNED WORK ACTIVITIES

The following work activities are planned for the period of 7/22 to 7/28.

- Process stockpiled soil for stabilization.
- Screen, place, mix and compact stabilized soil/cement into berm.
- Continue inspection, including continuation of perimeter and worker dust sampling; compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior, during, and after stabilization, and measurement of lift thickness.

The following work activities are planned for the period of 7/29 to 8/5.

- Finish soil stabilization of stabilized soil/cement into berm.
- Place and cover geotextile in the Soil Cover Grid Areas.
- Install fencing around and construct berm drainage and cover layers.
- Continue inspection including continuation of perimeter and worker dust sampling, compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior during and after stabilization, and measurement of lift thickness.

If you have questions with regard to this information, please call me at 708/268-8555 or Dean Jones at 319/328-3621.

Sincerely,

Michael Place
Manager, Environmental
Assessments Group

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

Versar INC.

July 31, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

RE: Progress Report 7/15 to 7/28 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of July 15 to July 28. The progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 7/29 to 8/11.

WORK COMPLETED - 7/15 to 7/28

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

During the work period the following activities were performed.

7/15 On-site progress meeting. Attendees include:

Mr. Jeff Weatherford - USEPA
Mr. Michael Place - Versar, Inc.
Mr. Dean Jones - Versar, Inc.
Ms. Susan Rossi - Versar, Inc.
Mr. Dick Schaffer - Envirocon, Inc.

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	100 %
Backfill of Soil/Cement Grids	100 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	50 %
Utility Trenches	30 %
Berm Construction	95 %
Berm Drainage, Cover & Fencing	0 %
Seeding and Mulching	0 %
Demobilization	0 %

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Versar INC.

Discussed project activities completed to date and planned activities to finish the project, prior to walking the site. After walking the site, discussion focused on the final disposition of the surface debris collected during site preparation. It was agreed that surface debris could be disposed of off-site as construction debris, pending approval of the landfill.

Survey crew delineated berm for placement of soil.

7/16 Patrick Engineering on-site to start compaction testing of backfill and soil/cement.

Soil stabilization equipment mobilized to site.

Started placement of Berm Lift No. 1.

Material screening continued.

7/17 Keith Krambeck of Scott Area Solid Waste Management Commission on-site to observe construction debris. It was decided that the debris could be disposed of as construction debris, without soil.

Placement of the soil/cement berm first lift completed. Due to uneven terrain, lift thickness measurements indicated that lift ranged in thickness from 5 to 14 inches in depth. Areas which measured greater than nine inches were cut to nine inches and reagents for Lift No. 1 were placed and mixed based on a nine-inch lift.

Material screening continued.

7/18 Berm Lift No. 1 was mixed and compacted. Compaction results indicated that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Started placement of Berm Lift No. 2. Fill was placed in three longitudinal passes to facilitate more efficient use of personnel during construction. The berm lift was placed in a 12-inch loose lift.

Material screening continuing.

Excavated utility trench (117 linear feet) for gas line on north side of Building 18.

Versar INC.

7/19 Berm Lift No. 2 was mixed and compacted. Compaction testing from the surface and mid-depth of the lift indicate that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Material screening continuing.

7/20 Berm Lift No. 2 was mixed and compacted to completion. Compaction testing from the surface and mid-depth of the lift indicate that the soil/cement was successfully compacted to 98 percent of the maximum dry density (standard proctor method).

Berm Lift No. 3 was placed in a 12-inch lift. The center pass included 6 inches of oversized material placed with 6 inches of soil.

7/21 Finished Lift No. 2c and placed Lift No. 3.

Screened material for stabilization.

7/22 Added and mixed reagent to Lift No. 3. Compaction results indicated that the lift was compacted to a minimum of 98% of the materials dry density. Started placing Lift No. 4a.

Screened material for stabilization.

7/23 Compaction testing of Lift No. 3b indicated that 98 percent of the maximum dry density obtained in accordance with a one-point proctor determination was met.

Finished placing Lift No. 4a, 4b, and 4c. Added and mixed reagents into Lift No. 4a and 4c. Lifts 4a and 4c were compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Met with Mr. Jeff Goldstein and Mr. Gary Bosler of Alter Trading Corporation, Mr. Jeff Brown of Envirocon, Inc. And Mr. Mike Place, Mr. Dean Jones and Ms. Susan Rossi of Versar, Inc. To discuss final drainage and grading options needed in addition to the remedial action. Authorization to start regrading the site was verbally received from Alter Trading.

Continued screening of material for soil stabilization.

Versar INC.

7/24 Regraded areas west of Building 41.

Started cleaning around rail road tracks.

Finished screening soil for stabilization.

7/25 Placed reagent, mixed and compacted Lift 4b to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Placed, added and mixed reagent then compacted Lift No. 5. Lift No. 5 was compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Started cleanup of melt shop pad, where excavated soil were stockpiled for stabilization.

Meeting on site to discuss drainage options between Mr. Bob Buckles, Mr. Brent Johnson, and Mr. Gary Bosler of Alter Trading Corporation, Mr. Jeff Brown of Envirocon and Mr. Dan Jones of Versar. Drainage options include either placement of storm sewers or construction of detention basin.

Talked with Mr. Bob Buckles about scheduling use of scrap yard tracked grapplers to load construction debris for landfill disposal on Tuesday of next week.

Cleaning up around railroad tracks.

7/26 Placed, added and mixed reagents, and compacted Lift No. 6 to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Cleaning around rail road tracks.

Prepared punch list of items to be finished prior to finishing project.

7/27 Placed Lift No. 7.

Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

RESULTS OF SAMPLING AND TEST DATA

The following test data are attached to this letter report.

Table 2 - Baseline and Actual Perimeter Air Monitoring Data.

Table 2
Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18	NS	0.014
6/19	0.051	0.031
6/20	0.125	0.049
6/21	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
6/27	0.409	0.284
6/28	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059
7/8	0.910	0.158

PLANNED WORK ACTIVITIES

The following work activities are planned for the period of 7/29 to 8/4.

- Finish screening, placing, mixing and compacting stabilized soil/cement into berm.
- Install drainage layer onto stabilized berm.
- Continue inspection, including continuation of perimeter and worker dust sampling, compaction testing of backfill and soil/cement, weight of fill placed in berm, moisture content of fill prior, during, and after stabilization, and measurement of lift thickness.
- Separate debris for disposal as construction debris.
- Install utility trenches.

The following work activities are planned for the period of 8/5 to 8/9.

- Place and cover geotextile in the Soil Cover Grid Areas.
- Install fencing around and construct berm drainage and cover layers.
- Continue inspection and compaction testing of backfill and drainage layer.
- Demobilization of August 9.
- Final site grading.

Versar INC.

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Versar Project No. 2453.005

July 31, 1996
Page 6

The projected finish date for remediation is August 9, 1996. The project is currently consistent with the revised schedule.

If you have questions with regard to this information, please call me at 708/268-8555 or Dean Jones at 319/328-3621.

Sincerely,

Michael Place/ND

Michael Place
Manager, Environmental
Assessments Group

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

GD\2453005\REPORTS\PR4.MBP

Versar INC.

August 8, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

RE: Progress Report 7/22 to 8/4 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of July 22 to August 4. The progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Work planned for the period from 8/5 to 8/9.

WORK COMPLETED - 7/22 to 8/4

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

During the work period the following activities were performed.

7/22 Added and mixed reagent to Lift No. 3. Compaction results indicated that the lift was compacted to a minimum of 98% of the materials dry density. Started placing Lift No. 4a.

Screened material for stabilization.

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	100 %
Backfill of Soil/Cement Grids	100 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	50 %
Utility Trenches	100 %
Berm Construction	100 %
Berm Drainage, Cover & Fencing	100 %
Seeding and Mulching	100 %
Demobilization	0 %

7/23 Compaction testing of Lift No. 3b indicated that 98 percent of the maximum dry density obtained in accordance with a one-point proctor determination was met.

Finished placing Lift No. 4a, 4b, and 4c. Added and mixed reagents into Lift No. 4a and 4c. Lifts 4a and 4c were compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Continued screening of material for soil stabilization.

7/24 Regraded areas west of Building 41.

Started cleaning around rail road tracks.

Finished screening soil for stabilization.

7/25 Placed reagent, mixed and compacted Lift 4b to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Placed, added and mixed reagent then compacted Lift No. 5. Lift No. 5 was compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Started cleanup of melt shop pad, where excavated soil were stockpiled for stabilization.

Cleaned up around railroad tracks.

7/26 Placed, added and mixed reagents, and compacted Lift No. 6 to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor determination.

Cleaned around rail road tracks.

Prepared punch list of items to be finished prior to finishing project.

7/27 Placed Lift No. 7.

7/29 Placed, added and mixed reagents, and compacted Lift No. 7 to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor method. Lift No. 7 was the final lift.

7/30 Started installation of berm drainage layer including placement of six-inch sand layer covered with a non-woven geotextile.

Excavated utility trenches between Buildings 18 and 41.

7/31 Continued installation of berm drainage layer including placement of non-woven geotextile and topsoil layers.

Conducted site cleanup and equipment decontamination.

8/1 Finished installation of berm drainage layer.

Started loading and transporting of construction debris to Scott Area Landfill.

Conducted site cleanup and equipment decontamination.

8/2 Berm drainage layer hydro-seeded.

Excavated utility trenches at Buildings 18 and 19.

Conducted site cleanup and equipment decontamination.

8/3 Placed non-woven geotextile in 'Soil Cover' Grid Areas and covered with crushed stone.

Conducted site cleanup and equipment decontamination.

Installed site drainage.

8/4 Conducted site cleanup and equipment decontamination.

Installed site drainage.

RESULTS OF SAMPLING AND TEST DATA

The following test data are attached to this letter report.

Table 2 - Baseline and Actual Perimeter Air Monitoring Data,

Table 2
Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18	NS	0.014
6/19	0.051	0.031
6/20	0.125	0.049
6/21	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
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6/28	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059
7/8	0.910	0.158

PLANNED WORK ACTIVITIES

The following work activities are planned for the period of 8/5 to 8/9.

- Place and cover geotextile in the 'Soil Cover Grid' Areas.
- Install fencing around finished berm.
- Continue inspection and compaction testing of backfill and drainage layer.
- Final site grading and drainage system installation.
- Demobilization on August 9.

The projected finish date for remediation is August 9, 1996. The project is currently consistent with the revised schedule.

If you have questions with regard to this information, please call me at 708/268-8555 or Dean Jones at 319/328-3621.

Sincerely,

Michael Place
Manager, Environmental
Assessments Group

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

Versar INC.

August 19, 1996

Mr. Jeff Weatherford, P.E.
U.S. Environmental Protection Agency
Superfund Division
726 Minnesota Avenue
Kansas City, Kansas 66101

RE: Progress Report 7/29 to 8/9 - Pacific Activities Limited
Versar Project No. 2453.005

Dear Mr. Weatherford:

Versar, Inc. has prepared this progress report for the period of July 29 through the end of field activities on August 9. This final progress report has been prepared in accordance with instructions provided in the U.S. EPA's consent order to Pacific Activities Limited dated June 6, 1995.

This progress report contains the following sections:

1) Work completed to comply with the consent order to PAL during the reporting period,

2) Results of sampling plan and test data relating to the consent order, and

3) Planned work activities.

WORK COMPLETED - 7/29 to 8/9

Remedial action includes either soil/cement stabilization or use of geotextile and a cover soil layer to stabilize contaminated soil at the PAL site. Reportable tasks to be completed during remediation with the percent of each task completed to date are provided in Table 1.

During the work period the following activities were performed.

7/29 Placed, added and mixed reagents, and compacted Lift No. 7 to a minimum of 98 percent of the maximum dry density obtained in accordance with a one point proctor method. Lift No. 7 was the final lift.

Table 1

TASK	COMPLETE
Mobilization	100 %
Site Preparation	100 %
Excavation of Soil/Cement Grids	100 %
Backfill of Soil/Cement Grids	100 %
Preparation of Cover Soil Grids	100 %
Backfill of Cover Soil Grids	100 %
Utility Trenches	100 %
Berm Construction	100 %
Berm Drainage, Cover & Fencing	100 %
Seeding and Mulching	100 %
Demobilization	100 %

MIDWEST REGIONAL OFFICE • Green Brook Executive Center • 200 West 22nd Street • Suite 250 • Lombard • Illinois 60148

7/30 Started installation of the berm drainage layer including placement of six-inch sand layer covered with a non-woven geotextile.

Excavated utility trenches between Buildings 18 and 41.

7/31 Continued installation of berm drainage layer including placement of non-woven geotextile and topsoil layers while conducting site cleanup and equipment decontamination.

8/1 Finished installation of berm drainage layer.

Started loading and transporting of construction debris to Scott Area Landfill.

Conducted site cleanup and equipment decontamination.

8/2 Berm drainage layer hydro-seeded.

Excavated utility trenches at Buildings 18 and 19.

Conducted site cleanup and equipment decontamination.

8/3 Placed non-woven geotextile in 'Soil Cover' Grid Areas and covered with crushed stone.

Conducted site cleanup and equipment decontamination.

Started installation of site drainage.

8/4 Conducted site cleanup and equipment decontamination. Continued installation of site drainage.

8/5 Placed geotextile in 'Soil Cover' grids and covered with crushed stone.

Fencing contractor started installation of chain link fencing.

8/6 Finished installing chain link fence.

8/7 Finished transporting construction debris to landfill.

8/8 Finished installation of drainage ditch and storm pipe along the south property boundary. Cleanup and decontamination of equipment.

8/9 Demobilization from site.

RESULTS OF SAMPLING AND TEST DATA

The following test data are included with this letter report.

Table 2 - Baseline and Actual Perimeter Air Monitoring Data:

Table 2 - Perimeter Dust Sample Results

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
6/18*	NS	0.014
6/19*	0.051	0.031
6/20*	0.125	0.049
6/21*	0.711	0.434
6/24	0.039	0.029
6/25	0.034	0.061
6/26	0.444	0.513
6/27	0.409	0.284
6/28	0.393	0.632
6/29	0.725	0.333
7/1	0.106	0.191
7/2	0.107	0.077
7/3	0.355	0.074
7/5	0.168	0.058
7/6	0.025	0.059

Date	Upwind Dust (mg/m^3)	Downwind Dust (mg/m^3)
7/8	0.910	0.158
7/9	0.208	0.257
7/10	0.023	0.131
7/11	0.216	0.257
7/12	0.0565	0.0572
7/16	0.135	0.978
7/17	NS	NS
7/18	0.0969	0.315/0.791
7/19	0.145	0.174
7/22		
7/23		
7/24		
7/25		
7/26		
7/29		

* Baseline Perimeter Dust Monitoring

PLANNED WORK ACTIVITIES

Field activites finished on August 9, 1996. No further site remedial activities are planned. Preparation of the closure report is underway with an expected completion date of September 20, 1996.

If you have questions with regard to this information, please call me or Dean Jones at 708/268-8555.

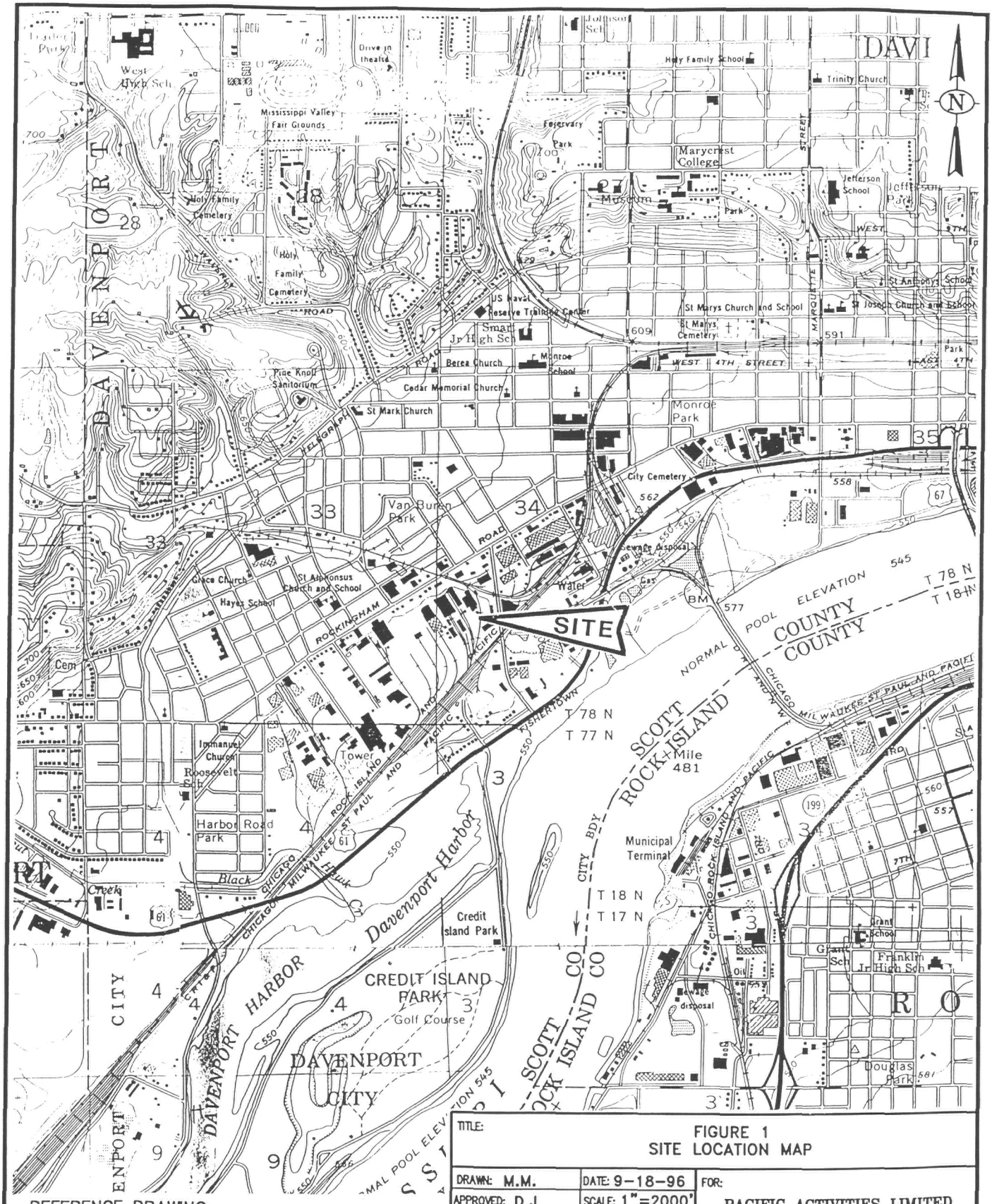
Sincerely,

Michael Place
Manager, Environmental
Assessments Group

cc: Mr. Dean Jones - Versar, Inc.
Mr. Jeff Goldstein - PAL
Mr. Curt Beason - Lane & Waterman
Mr. Brian Molloy - Piper & Marbury
Mr. Jeff Brown - Envirocon, Inc.

APPENDIX C

FIGURES
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA



REFERENCE DRAWING:
DAVENPORT EAST, IA 7.5 MINUTE USGS
TOPOGRAPHIC QUADRANGLE MAP 1953
PHOTOREVISED 1970 & 1975
T78N, R3E, SEC. 34

TITLE: FIGURE 1
SITE LOCATION MAP

DRAWN: M.M.	DATE: 9-18-96
APPROVED: D.J.	SCALE: 1"=2000'

FOR:
PACIFIC ACTIVITIES LIMITED
2117 STSTE STREET
BETTENDORF, IA

Versar INC.
200 W. 22nd STREET, SUITE 250
LOMBARD, IL 60148

PROJECT NO. 2453005
DRAWING NO. 24535D3

LEGEND

- UTILITY TRENCH
- PROPERTY BOUNDARY
- CB — APPROXIMATE LOCATION OF CATCH BASIN
- MONITORING WELL
- FENCE
- STORMWATER DRAINAGE DITCH
- UNDERGROUND STORMWATER PIPE
- CONCRETE AREA
- SOIL/CEMENT EXCAVTION AREA
- PLASTIC CASING FRAGMENT EXCAVTION AREA

NOTE: SOME AREAS OF REMOVED SOIL MAY BE COVERED WITH FABRIC FOR GEOTECHNICAL, NOT ENVIRONMENTAL, REASONS.

APPROXIMATE SCALE

50' 0 50' 100'

NOTES:

1. CONTOURS, BUILDINGS, AND SITE FEATURES SUPPLIED BY OWNER FROM TOPOGRAPHIC AND BOUNDARY SURVEY BY SHIVE-HATTERY ENGINEERS PROJECT NO. 3933302-0
2. BOUNDARY AND GRID BASED ON BOUNDARY SURVEY BY THE SCHEMMER ASSOCIATES DATED 2/26/92 TSA JOB NO. 9202-010

NO.	REVISIONS	BY	CHK	APP	DATE

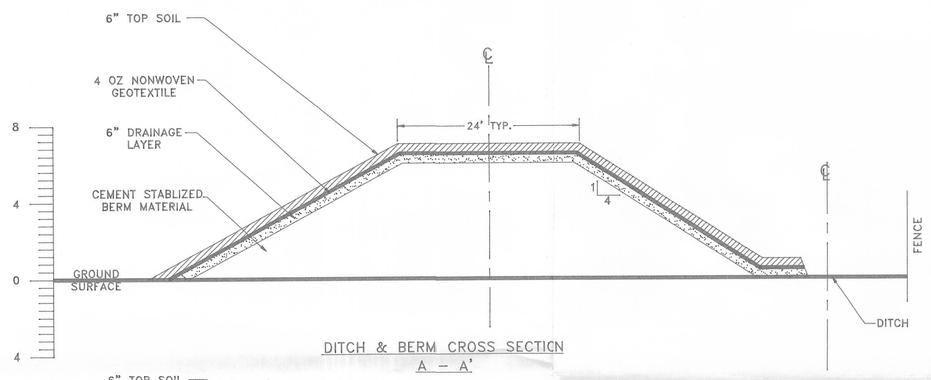
TITLE: FIGURE 2
FINAL SOIL-CEMENT GRID PLAN

DESIGNED:		APPROVED: M.P.	
DRAWN: M.M.		DATE: 9-19-96	
CHECKED: D.J.		SCALE: 1"=50'	

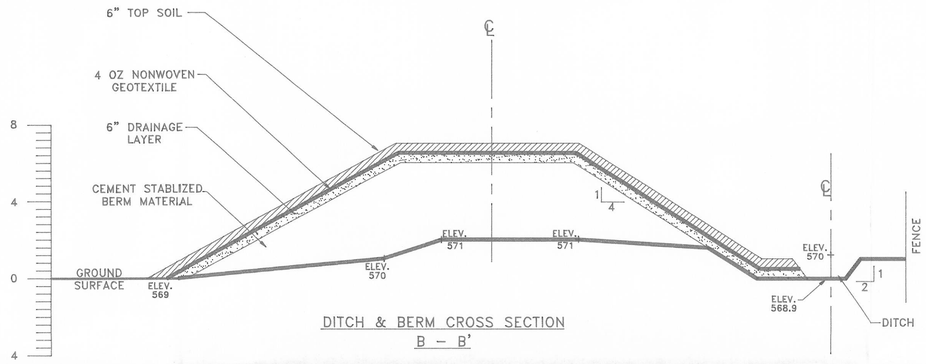
Versar INC.
200 W. 22nd STREET, SUITE 250
LOMBARD, IL 60148

FOR: PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

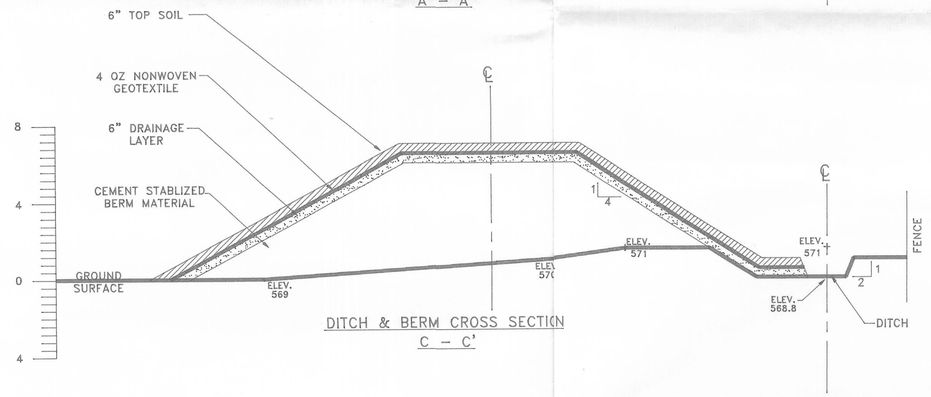
PROJECT NO. 2453005
DRAWING NO. 24535D1



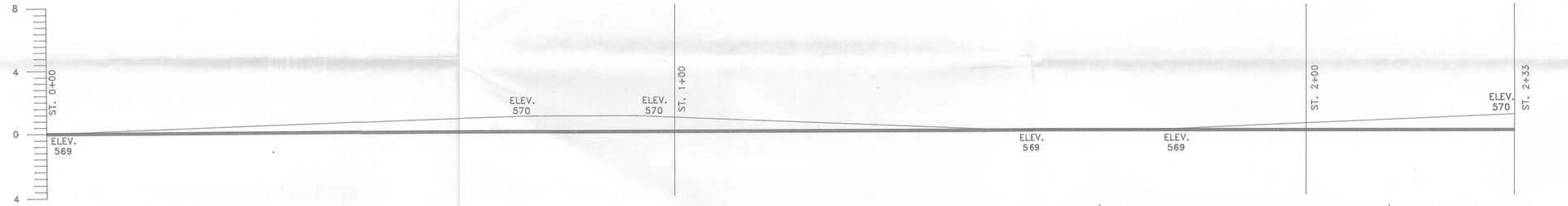
DITCH & BERM CROSS SECTION
A – A'

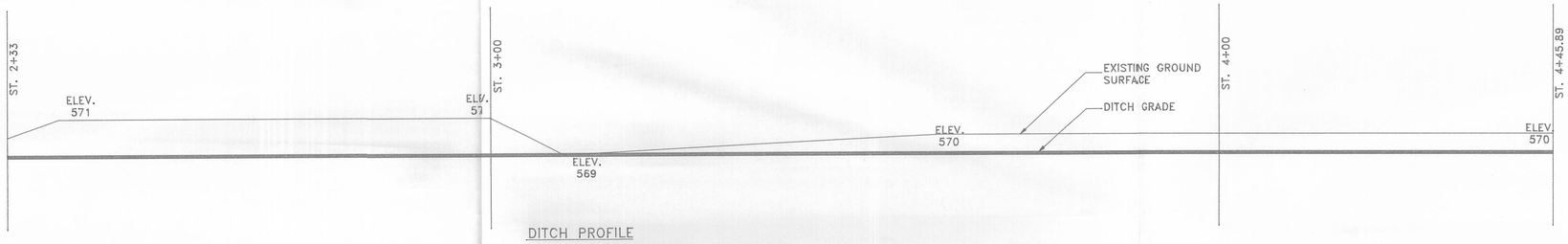


DITCH & BERM CROSS SECTION
B – B'

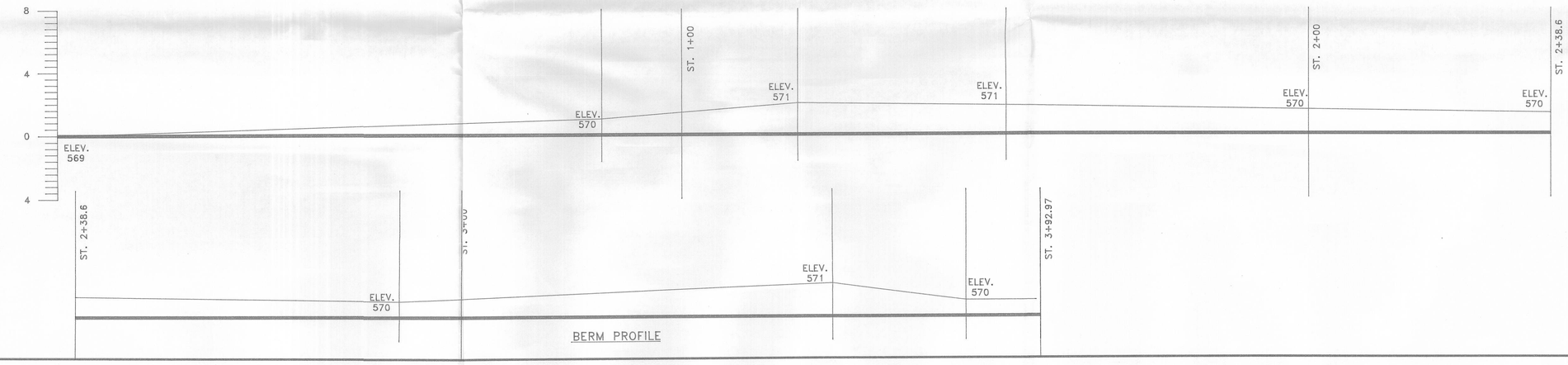


DITCH & BERM CROSS SECTION
C – C'





DITCH PROFILE



BERM PROFILE

NOTE: REFERENCE DRAWING NO. 2453D05 – CROSS SECTION LOCATION MAP.

VERTICAL SCALE
4' 0 4' 8'

HORIZONTAL SCALE
10' 0 10' 20'

NO.	REVISIONS	BY	CHK	APP	DATE

TITLE: PROFILES AND CROSS SECTIONS

DESIGNED:	APPROVED: L.H.
DRAWN: M.M.	DATE: 5-13-96
CHECKED: L.H.	SCALE: AS SHOWN

Versar INC.

FOR:
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
PAVENPORT, IOWA

PROJECT NO. 2453004
DRAWING NO. 24534D04

LEGEND

- UTILITY TRENCH
- PROPERTY BOUNDARY
- CB● APPROXIMATE LOCATION OF CATCH BASIN
- MONITORING WELL
- FENCE
- STORMWATER DRAINAGE DITCH
- UNDERGROUND STORMWATER PIPE
- CONCRETE AREA
- SOIL COVER AREAS

NOTE: SOME AREAS OF REMOVED SOIL MAY BE COVERED WITH FABRIC FOR GEOTECHNICAL, NOT ENVIRONMENTAL, REASONS.

APPROXIMATE SCALE

50' 0 50' 100'

NOTES:

1. CONTOURS, BUILDINGS, AND SITE FEATURES SUPPLIED BY OWNER FROM TOPOGRAPHIC AND BOUNDARY SURVEY BY SHIVE-HATTERY ENGINEERS PROJECT NO. 3933302-0
2. BOUNDARY AND GRID BASED ON BOUNDARY SURVEY BY THE SCHEMMER ASSOCIATES DATED 2/26/92 TSA JOB NO. 9202-010

NO.	REVISIONS	BY	CHK	APP	DATE

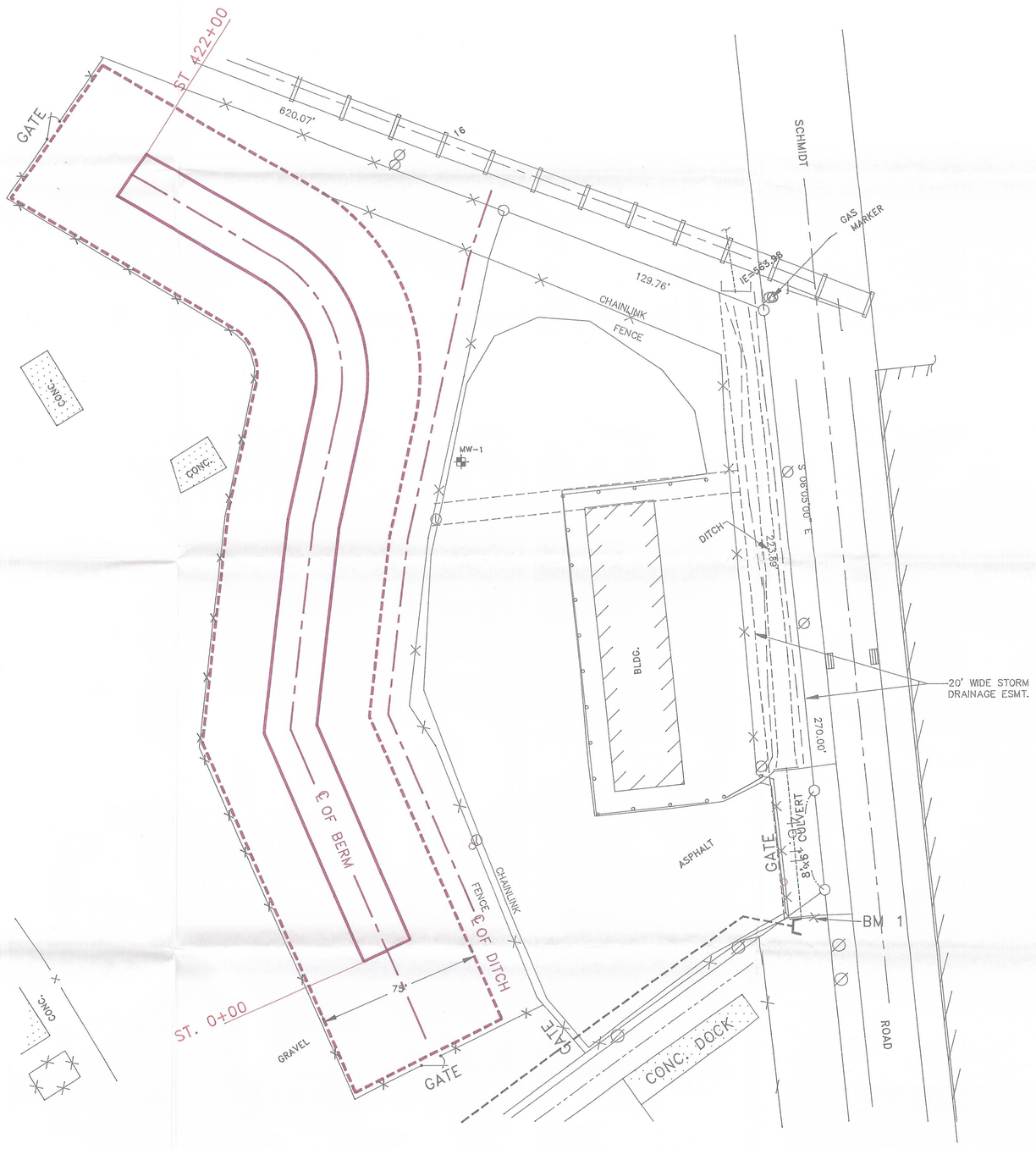
TITLE: FIGURE 3
FINAL SOIL COVER GRID PLAN

DESIGNED:		APPROVED:	M.P.
DRAWN:	M.M.	DATE:	9-19-96
CHECKED:	D.J.	SCALE:	1"=50'

Versar INC.
200 W. 22nd STREET, SUITE 250
LOMBARD, IL 60148

FOR: PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

PROJECT NO. 2453005
DRAWING NO. 24535D1



LEGEND

- MONITOR WELL
- FIRE HYDRANT
- LIGHT POLE
- POWER POLE
- WATER VALVE
- MANHOLE
- TRAFFIC SIGN
- FENCE
- CATCH BASIN
- MANHOLE
- CONCRETE

NOTES:

1. CONTOURS, BUILDINGS, AND SITE FEATURES SUPPLIED BY OWNER FROM TOPOGRAPHIC AND BOUNDARY SURVEY BY SHIVE-HATTERY ENGINEERS PROJECT NO. 3933302-0
2. BOUNDARY AND GRID BASED ON BOUNDARY SURVEY BY THE SCHEMMER ASSOCIATES DATED 2/26/92 TSA JOB NO. 9202-010

APPROXIMATE SCALE
30' 0 30' 60'

NO.	REVISIONS	BY	CHK	APP	DATE

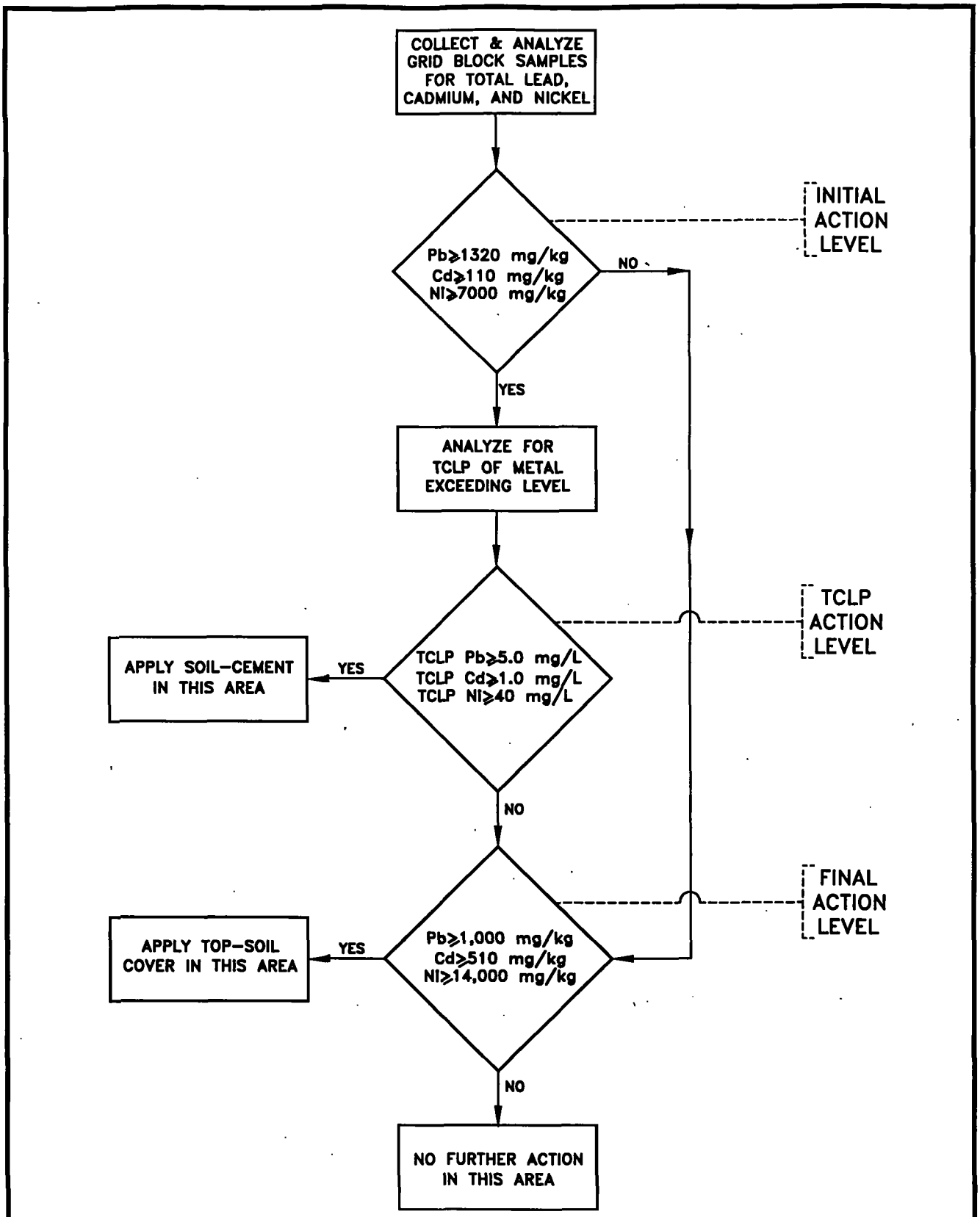
TITLE:
FIGURE 5
FINAL BERM CONSTRUCTION PLAN VIEW

DESIGNED:	APPROVED: L.H.
DRAWN: M.M.	DATE: 9-19-96
CHECKED: D.J.	SCALE: 1"=30'

Versar INC.

FOR:
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

PROJECT NO. 2453005
DRAWING NO. 24535D2



LEGEND:

Pb = LEAD
Cd = CADMIUM
Ni = NICKEL

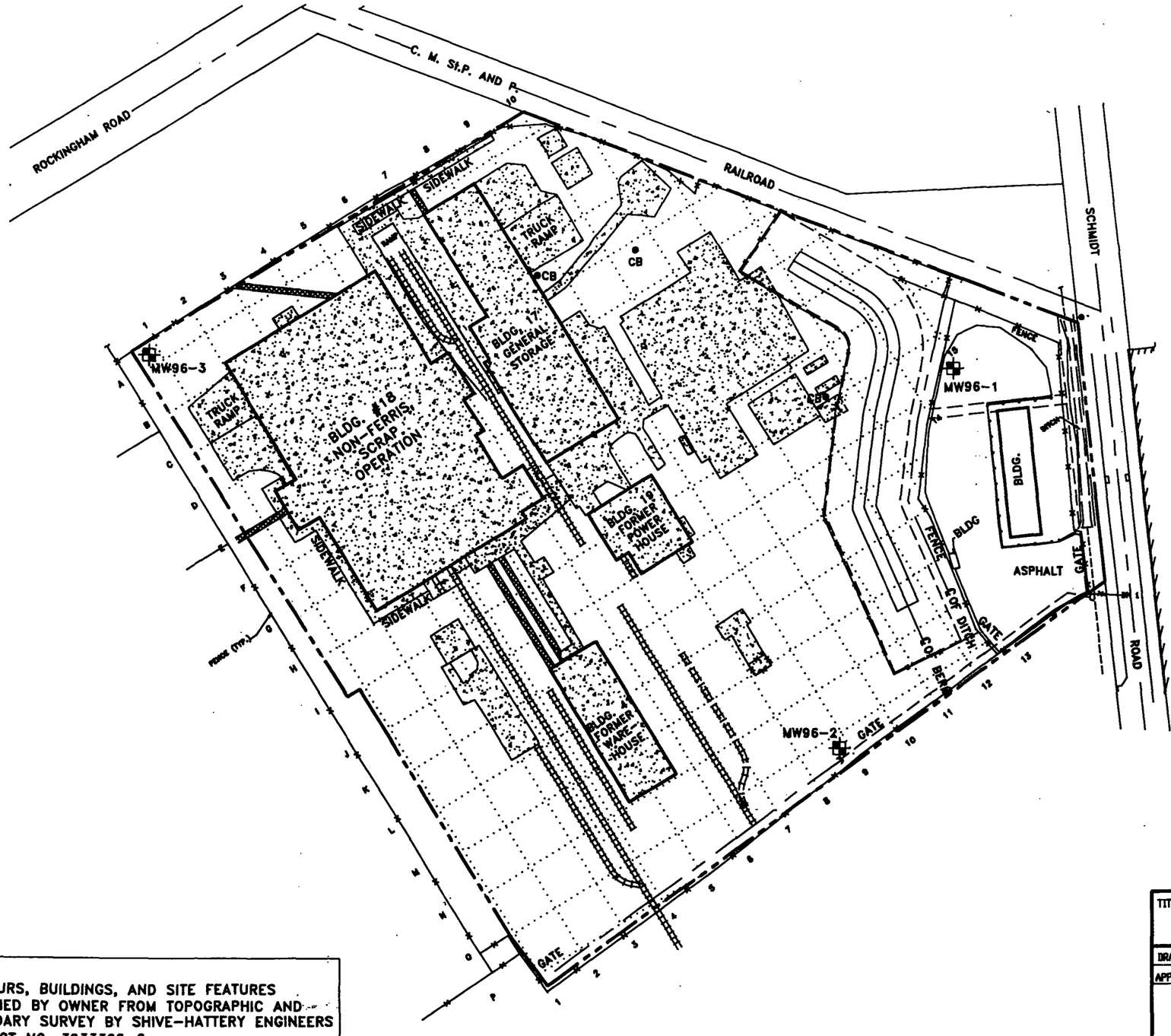
TITLE: FIGURE 4
SAMPLING AND ANALYSIS PLAN DECISION TREE

DRAWN: M.M. | DATE: 9-23-96
APPROVED: M.P. | SCALE: N.T.S.

Versar INC.
1520 KENSINGTON ROAD
OAK BROOK, IL. 60521

FOR:
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

PROJECT NO. 2453005
DRAWING NO. 24535D6



LEGEND

- UTILITY TRENCH
- PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF CATCH BASIN
- FENCE
- STORMWATER DRAINAGE DITCH
- UNDERGROUND STORMWATER PIPE
- CONCRETE AREA
- MONITORING WELL

APPROXIMATE SCALE

120' 0 120' 240'

NOTES:

1. CONTOURS, BUILDINGS, AND SITE FEATURES SUPPLIED BY OWNER FROM TOPOGRAPHIC AND BOUNDARY SURVEY BY SHIVE-HATTERY ENGINEERS PROJECT NO. 3933302-0

TITLE: FIGURE 6
MONITORING WELL LOCATION PLAN

DRAWN M.M.	DATE 10-22-96
APPROVED D.J.	SCALE 1"=120'

Vergar INC.
200 W. 22nd STREET, SUITE 250
LOMBARD, IL 60148

FOR: PACIFIC ACTIVITIES LIMITED
826 SCHMIDT ROAD
DAVENPORT, IOWA

PROJECT NO. 2453005
DRAWING NO. 24535D4

APPENDIX D

BERM CONSTRUCTION COMPACTION RESULTS
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 2635 Moisture Standard: 747

Job No: L6052.A0
Date Tested: 7-18-96
Page: 1 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
1	LIFT #1	6"	0+50 20' LEFT OFFSET FROM CENTER
2			0+50 CENTER
3			0+50 20' RIGHT OFFSET FROM CENTER
4			1+00 20' LEFT " " "
5			1+00 CENTER
6			1+00 20' RIGHT OFFSET FROM CENTER
7			2+00 20' LEFT " " "
8			2+00 CENTER
9			2+00 20' RIGHT OFFSET FROM CENTER
10	↓	↓	3+00 20' LEFT " " "

TEST DATA

Test No.	1 *	2	3	4	5	6	7	8	9	10
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	608	541	593	626	565	689	665	588	1515	670
Aver. Moisture Count	177	156	185	194	150	174	185	225	181	214
Density Ratio										
Moisture Ratio										
Wet Density, pcf	142.6	151.9	144.5	140.4	148.4	133.8	136.2	145.0	89.9	135.5
Weight of Water, pcf	18.1	17.6	18.8	19.3	16.2	17.5	18.5	22.0	16.4	20.7
Dry Density, pcf	124.5	134.1	125.7	121.1	132.2	116.3	117.7	123.0	73.6	114.8
Moisture Content, %	14.5	12.4	14.9	15.9	12.3	15.0	15.7	17.9	22.1	18.0
Control Density, pcf	109.5	—	—	—	—	—	—	—	—	→
Opt. Moisture, %	16.2	...	...	...	...	...	...	...	...	...
% Compaction	113.6	123.3	114.7	110.6	120.8	106.2	107.5	112.9	67.1	104.8
Results										

P: Test Passed F: Test Failed R: Retest of Failed Area

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* ... SPECIFIED FAIL TEST WAS

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 2635 Moisture Standard: 747

Job No: L6052.A0
Date Tested: 7-18-96
Page: 2 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
11	LIFT #1	6"	3+00 CENTER
12	↓	↓	3+00 20' RIGHT OFFSET FROM CENTER
13			3+75 20' LEFT " " "
14			3+75 CENTER
15			3+75 20' RIGHT OFFSET FROM CENTER
13.5			3+75 10' LEFT OF TEST 14

TEST DATA

Test No.	11	12	13	14	15	9R3**	13.5			
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0			
Time Interval, min.	1	1	1	1	1	1	1			
Aver. Density Count	722	841	590	617	788	706	614			
Aver. Moisture Count	169	184	142	206	178	170	2:1			
Density Ratio										
Moisture Ratio										
Wet Density, pcf	130.7	121.2	145.0	141.4	125.1	132.2	141.8			
Weight of Water, pcf	17.0	17.8	15.4	20.3	17.5	17.1	20.6			
Dry Density, pcf	113.7	103.4	129.6	121.1	107.7	115.1	121.2			
Moisture Content, %	15.0	17.2	11.9	16.8	16.2	14.1	17.0			
Control Density, pcf	109.5	→	→	→	→	→	→			
Opt. Moisture, %	16.2	→	→	→	→	→	→			
% Compaction	103.8	94	118.4	121.1	98.2	105.0	110.6			
Results										

P: Test Passed F: Test Failed R: Retest of Failed Area

ref: h\basefile\forms\nukeform.doc

ATRICK
IGINEERING INC.

PROJECT NO L6052.A0

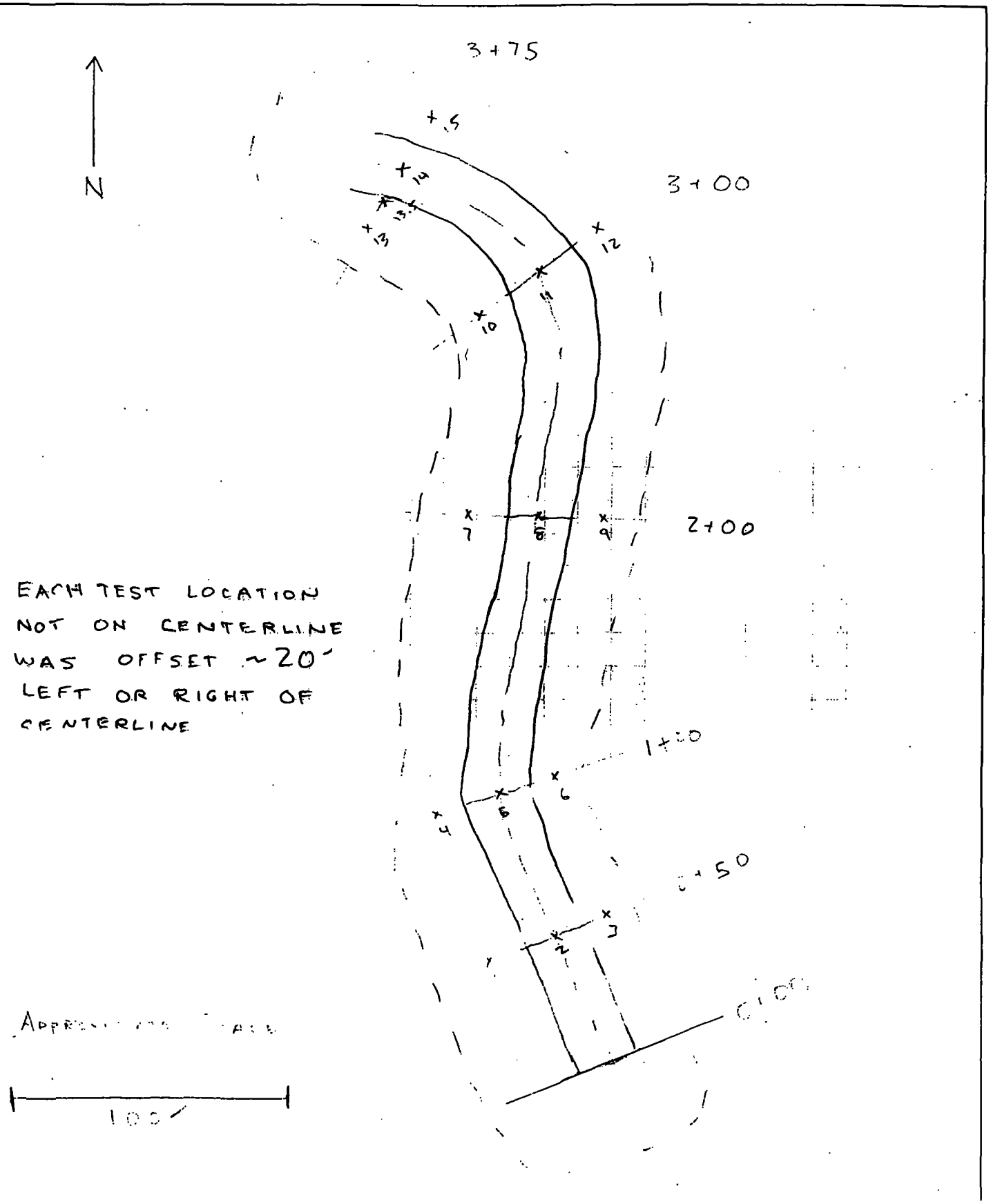
PROJECT P.A.L. REMEDIATION - VERSAR INC.

CALCULATED BY CEE DATE 7-19-96

CHECKED BY _____ DATE _____

SHEET 1 OF 1

DENSITY / MOISTURE TEST LOCATIONS



ATRICK
NGINEERING INC.

PROJECT NO L6052.A0

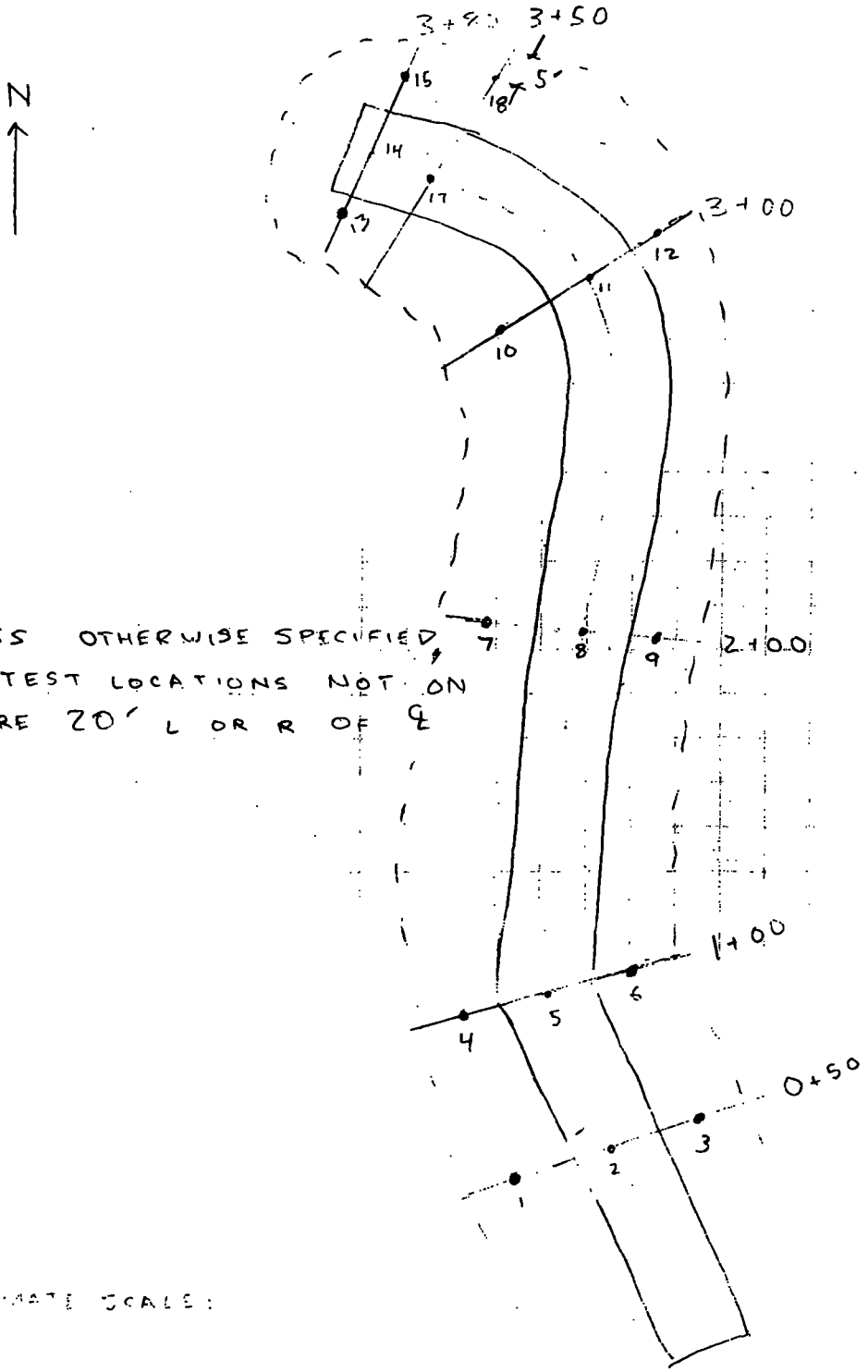
PROJECT P.A.L. REMEDIATION - VERSAR INC.

CALCULATED BY CEC DATE 7-20-96

CHECKED BY _____ DATE _____

SHEET 1 OF 1

LOCATIONS OF MOISTURE AND DENSITY MEASUREMENTS LIFT # 1 & 2



UNLESS OTHERWISE SPECIFIED, ALL TEST LOCATIONS NOT ON ℄ ARE 20' L OR R OF ℄

APPROXIMATE SCALE:

100'

LIFT # 1

ONE-Point

Moisture / Density Worksheet

Project No. L6052.00

☒ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method A

Mold Volume: ☒ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description silty sand/with cement & bentonite

Tested by: JEB/CE Date: 7-18-96 Calculated by: CE Checked by: JFB

Bag Number										
Wt. of wet soil and mold, ~~lbs.~~ grms	6128									
Wt. of mold, ~~lbs.~~ grms	4197									
Wt. of wet soil, lbs [W_{sw}]	4.25									
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]	127.5									
Pocket Pen., tsf	-									
Tare No.										
Wt. of tare, gms.	273									
Wt. of wet sample & tare, gms.	352									
Wt. of dry sample & tare, gms.	341									
Moisture content, %	16.2									
Avg. moisture contents, %	-									
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]	109.7									

454 grms/lb

PATRICK ENGINEERING, INC.

LIFT #1

Moisture / Density Worksheet

Project No. L6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description SOIL / CEMENT / BENTONITE MIX {FIRST LIFT}

Tested by: CEE Date: 7-18-96 Calculated by: JFB Checked by: CEE

	MEASUREMENTS USED TO CALCULATE MOISTURE CORRECTION FACTOR											
Bag Number												
Wt. of wet soil and mold, lbs.											6128	
Wt. of mold, lbs.											4197	
Wt. of wet soil, lbs [Wsw]											1931	
Wet unit weight, pcf [γwet = (Wsw ÷ mold vol.)]	0+70 20'R of ℄	1+00 20'R of ℄	PT #3	PT #4	PT #5						127.5 PCF	
~~Pocket Pen., tsf~~ TORVANE	2.0	2.0	1.5	1.5							1.5	
Tare No.	OLD	NEW	NEW	OLD	NEW						NEW	
Wt. of tare, gms.	227	273	273	227	273						273	
Wt. of wet sample & tare, gms.	331	350	368	315	357						352	
Wt. of dry sample & tare, gms.	319	344	356	302	347						341	
Moisture content, %	13.0	8.4	17.3	17.3	13.5						16.2	
Avg. moisture contents, %												
Dry unit weight, pcf [γwet ÷ (1+(WC%÷100))]											109.8 PCF	

$$\frac{1931\ g}{0.0333\ ft^3} \times \frac{1}{454}\ LB/g = 127.5\ PCF$$

PATRICK ENGINEERING, INC.

ATRICK
NGINEERING INC.

PROJECT NO 46052.A0
PROJECT P.A.L. REMEDIATION - VERSAR INC.
CALCULATED BY JFB DATE 7-18-96
CHECKED BY CEE DATE 7-18-96
SHEET 1 OF 1

CALCULATION OF MOISTURE CORRECTION FACTOR (LIFT #1)

FROM TROXLER 3411-B INSTRUCTION MANUAL:

$$\text{CORRECTION FACTOR} = \frac{\%\text{M OVENDRY} - \%\text{M GAUGE}}{100 + \%\text{M GAUGE}} \times 1000$$

THE FOLLOWING FIELD MEASUREMENTS WERE MADE ON FIRST LIFT MATERIAL JUST BEFORE COMPACTION:

STATION	OFFSET FROM ℄	%M OVENDRY	%M GAUGE	%M OVENDRY − %M GAUGE
0+70	20' R	13.0	8.1	4.9
1+00	20' R	8.4	8.1	0.3
PT #3 ★	–	17.3	10.9	6.4
PT #4 ★	–	17.3	8.8	8.5
PT #5 ★	–	13.5	10.4	3.1
AVERAGES:		13.9	9.3	4.6

$$\text{CORRECTION FACTOR} = \frac{4.6}{100 + 9.3} \times 1000 = 42$$

THIS CORRECTION FACTOR WAS APPLIED TO ALL MOISTURE CONTENT MEASUREMENTS MADE ON THE COMPACTED FIRST LIFT (7-19-96).

★ PTS 3, 4, AND 5 WERE LOCATED BETWEEN STA 1+00 AND STA 1+50

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 2589 Moisture Standard: 740

Job No: L6052.A0
Date Tested: 7-20-96
Page: 1 of 3
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
2	LIFT #2	12"	STA 0+50 ℄
3	"	"	" 20' R OF ℄
6	"	"	STA 1+00 20' R OF ℄
5	"	"	" ℄
8	"	"	STA 2+00 ℄
9	"	"	" 20' R OF ℄
11	"	"	STA 3+00 ℄
12	"	"	" 20' R OF ℄
17	"	"	STA 3+50 ℄

TEST DATA

Test No.	2	3	6	5	8	9	11	12	17	
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	
Time Interval, min.	1	1	1	1	1	1	1	1	1	
Aver. Density Count	667	739	628	631	705	745	717	684	650	
Aver. Moisture Count	193	166	1414	196	175	149	190	146	184	
Density Ratio	—	—	—	—	—	—	—	—	—	
Moisture Ratio	—	—	—	—	—	—	—	—	—	
Wet Density, pcf	131.7	128.1	139.1	138.6	131.1	127.7	129.9	[illegible]	136.5	
Weight of Water, pcf	17.7	15.4	13.9	[illegible]	[illegible]	13.8	13.3	[illegible]	17.0	
Dry Density, pcf	117.0	[illegible]	[illegible]	120.5	[illegible]	[illegible]	[illegible]	[illegible]	119.5	
Moisture Content, %	15.1	13.6	11.1	15.0	13.1	11.6	15.4	11.6	14.3	
Control Density, pcf	1049	—							→	
Opt. Moisture, %	11.9	—							→	
% Compaction	111.6	107.5	119.5	[illegible]	109.6	109.1	107.4	113.8	[illegible]	
Results	P	P	P	P	P	P	P	P	P	

P: Test Passed F: Test Failed R: Retest of Failed Area

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION — Job No: L6052.A0

Client: VERSAR INC. — Date Tested: 7-20-96

Inspector: CHRIS ENGLISH — Page: 2 of 3

Density Standard: 2369 — Moisture Standard: 741 — Meter No.: 3111-B

Test No.	Elev.	Lift Thick.	Location
15	LIFT #2	12"	STA 3+80 20' R of ℄
14	"	"	" ℄
1	"	"	STA 0+50 20' L of ℄
4	"	"	STA 1+00 "
7	"	"	STA 2+00 "
10	"	"	STA 2+00 "
18	"	"	STA 3+50 "
13	"	"	STA 3+80 "
4 5"CUT	"	"	STA 1+00 20' L OF ℄ 5" BELOW TOP OF LIFT
7 5"CUT	"	"	STA 2+00 " "

TEST DATA

Test No.	15	14	1	4	7	10	18	13	4 5" CUT	7 5" CUT
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	673	653	660	680	633	694	703	671	1016	716
Aver. Moisture Count	152	162	188	189	192	202	185	201	139	175
Density Ratio	—	—	—	—	—	—	—	—	—	
Moisture Ratio	—	—	—	—	—	—	—	—	—	
Wet Density, pcf	134.3	136.3	135.5	133.4	135.1	132.0	131.2	134.3	109.6	130.1
Weight of Water, pcf	14.4	15.3	17.3	17.3	17.7	18.3	17.0	18.3	12.7	16.1
Dry Density, pcf	119.9	121.0	118.1	116.1	120.6	113.7	114.3	116.0	96.9	114
Moisture Content, %	12.0	12.6	14.7	14.9	14.7	16.1	14.8	15.8	13.1	14.2
Control Density, pcf	121.8									
Opt. Moisture, %	14.8									
% Compaction	114.4	12.5	112.7	110.8	115.1	108.5	109.1	110.7	92.5	108.8
Results	P	P	P	P	P	P	P	P	(F)	P

P: Test Passed F: Test Failed R: Retest of Failed Area

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NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 7589 Moisture Standard: 740

Job No: L6052.A0
Date Tested: 7-20-96
Page: 3 of 3
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
10 5" CUT	LIFT #2	12"	STA 3+00 20' L of Q 5" BELOW TOP OF LIFT
18 5" CUT	"	"	STA 3+50 5' L of R. EDGE "
41 5" CUT	"	"	STA 1+00 20' L of Q "

TEST DATA

Test No.	10 5" CUT	18 5" CUT	41 5" CUT							
Soil No.										
Probe Depth, in.	0	0	0							
Time Interval, min.	1	1	1							
Aver. Density Count	775	749	691							
Aver. Moisture Count	206	207	173							
Density Ratio	-	-	-							
Moisture Ratio	-	-	-							
Wet Density, pcf	125.0	127.1	132.4							
Weight of Water, pcf	18.5	18.6	16.0							
Dry Density, pcf	106.5	108.5	116.4							
Moisture Content, %	17.4	17.1	13.7							
Control Density, pcf	104.8	→	→							
Opt. Moisture, %	19.8	→	→							
% Compaction	101.6	103.5	111.1							
Results	P	P	R/P							

P: Test Passed F: Test Failed R: Retest of Failed Area

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NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 3411 Moisture Standard: 725

Job No: L6052.A0
Date Tested: 7-19-96
Page: 1 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
6	LIFT #2	12"	STA 1+00 20' R OF ℄
9	"	"	STA 2+00 20' R OF ℄
9 COR	"	"	" " MOISTURE CORRECTION = 5
12	"	"	STA 3+00 20' R OF ℄
16	"	"	STA 3+50 5' L OF R. EDGE
15	"	"	STA 3+80 20' R OF ℄
6	"	"	STA 1+00 "
6 5" CUT	"	"	" " 5" BELOW TOP OF LIFT
9 5" CUT	"	"	STA 2+00 " "
16 5" CUT	"	"	STA 3+50 5' L OF R. EDGE "

TEST DATA

Test No.	6	9	9	12	16	15	6	6 5" CUT	9 5" CUT	16 5" CUT
Soil No.			9 COR							
Probe Depth, in.	0	0	6	0	0	0	6	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	686	778	779	731	736	682	1955	852	913	900
Aver. Moisture Count	142	136	131	142	145	163	139	151	144	158
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	132.9	124.9	124.8	128.7	128.3	133.2	127.2	119.3	115.4	116.1
Weight of Water, pcf	11.6	11.0	9.4	11.5	11.8	13.3	11.3	12.2	11.6	12.7
Dry Density, pcf	121.3	113.9	115.4	117.2	116.5	119.9	115.9	107.2	103.8	103.4
Moisture Content, %	9.5	9.6	8.2	9.8	10.1	11.1	9.7	11.4	11.1	12.3
Control Density, pcf (STANDARD PROCTOR)	104.8									→
Opt. Moisture, %	19.8									→
% Compaction	115.7	108.6	110.1	111.8	111.2	114.4	112.6	102.3	99.0	98.7
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

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NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION — Job No: L6052.A0

Client: VERSAR INC. — Date Tested: 7-19-96

Inspector: CHRIS ENGLISH — Page: 2 of 2

Density Standard: 2584 — Moisture Standard: 725 — Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
5 5" CUT	LIFT #2	12"	STA 1+00 ℄ 5" BELOW TOP OF LIFT
5	"	"	"
8 5" CUT	"	"	STA 2+00 ℄ 5" BELOW TOP OF LIFT
8	"	"	"
11	"	"	STA 3+00 ℄
17 5" CUT	"	"	STA 3+50 ℄ 5" BELOW TOP OF LIFT
17	"	"	"
14	"	"	STA 3+80 ℄
3	"	"	STA 0+50 20' R OF ℄
2	"	"	℄

TEST DATA

Test No.	5 5" CUT	5	8 5" CUT	8	11	17 5" CUT	17	14	3	2
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	824	661	918	635	600	867	654	617	649	630
Aver. Moisture Count	113	216	136	224	222	191	162	214	187	209
Density Ratio	—	—	—	—	—	—	—	—	—	—
Moisture Ratio	—	—	—	—	—	—	—	—	—	—
Wet Density, pcf	121.5	135.1	115.1	137.8	142.0	118.4	[illegible]	140.0	136.5	138.5
Weight of Water, pcf	8.0	15.1	10.9	[illegible]	18.3	10.5	[illegible]	17.6	15.3	17.2
Dry Density, pcf	112.4	117.3	[illegible]	[illegible]	123.6	107.9	[illegible]	[illegible]	121.1	121.3
Moisture Content, %	9.0	17.7	10.5	10.4	14.8	9.7	11.2	14.4	12.7	14.2
Control Density, pcf (STANDARD PROCTOR)	104.8	--->								
Opt. Moisture, %	19.8	--->								
% Compaction	107.3	111.9	99.4	113.9	117.9	103.0	117.0	117.0	115.6	115.7
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

LIFT #2

Moisture / Density Worksheet

Project No. L6052.A

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description SOIL / CEMENT / BENTONITE MIX (SECOND LIFT)

Tested by: CFE Date: 7-19-96 Calculated by: CFE Checked by: _____

			MEASUREMENTS USED TO CALCULATE MOISTURE CORRECTION FACTOR						STANDARD PROCTOR	
Bag Number										
Wt. of wet soil and mold, lbs.									6094	
Wt. of mold, lbs.									4197	
Wt. of wet soil, lbs [Wsw]									1897	
Wet unit weight, pcf [γwet = (Wsw ÷ mold vol.)]			STA 0+25 30'R of ℄		STA 0+25 20'R of ℄	0+50 10'R of ℄	STA 2+00 20'L of ℄	STA 2+00 ℄	125.5 PCF	
~~Pocket Pen.~~, tsf (FIELD)			1.0		1.0	1.0	1.0	1.0	1.0	
Tare No.			NEW		OLD	NEW	OLD	NEW	OLD	
Wt. of tare, gms.			275		227	275	227	275	227	
Wt. of wet sample & tare, gms.			353		323	385	341	355	354	
Wt. of dry sample & tare, gms.			343		313	366	333	346	333	
Moisture content, %			14.7		11.6	20.9	10.4	12.7	19.8	
Avg. moisture contents, %									19.8	
Dry unit weight, pcf [γwet ÷ (1+(WC%÷100))]									104.8	

LIFT DENSITY = $\frac{1897\ g}{0.0333\ FT^3} \times \frac{1}{454}\ \frac{LB}{g} = 125.5\ PCF$

PATRICK ENGINEERING, INC.

PATRICK
ENGINEERING INC.

PROJECT NO. L6052.A0
PROJECT P.A.L. REMEDIATION - VERSAR INC.
CALCULATED BY CEE DATE 7-20-96
CHECKED BY _____ DATE _____
SHEET 1 OF 1

TITLE CALCULATION OF MOISTURE CORRECTION FACTOR (LIFT #2)

FROM TROXLER 3411.B INSTRUCTION MANUAL:

$$\text{CORRECTION FACTOR} = \frac{\%\,M\ \text{OVENDRY} - \%\,M\ \text{GAUGE}}{100 - \%\,M\ \text{AVG}} \times 100$$

THE FOLLOWING FIELD MEASUREMENTS WERE MADE ON SECOND LIFT MATERIAL JUST BEFORE COMPACTION:

STATION	OFFSET FROM ℄	% M OVENDRY	% M GAUGE	% M OVENDRY - % M GAUGE
0+25	30' R	14.7	9.8	4.9
1+00	5' L	20.9	11.5	9.4
0+25	25' R	11.6	8.4	3.2
2+00	20' L	10.4	11.7	-1.3
2+00	0	12.7	12.5	0.2
AVERAGES:		14.1		5.3

$$\text{CORRECTION FACTOR} = \frac{5.3}{100 - 14.1} \times 100 = 5.4$$

A CORRECTION FACTOR OF 5.4% WAS APPLIED TO THE MOISTURE MEASUREMENTS MADE ON COMPACTED SECOND LIFT (7.7%).

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 2583 Moisture Standard: 742

Job No: L6052.A0
Date Tested: 7-22-96
Page: 1 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
3	LIFT #3	12"	STA 0+50 15' R of CENTER LINE
6	"	"	STA 1+00 "
9	"	"	STA 2+00 "
12	"	"	STA 3+00 "
15	"	"	STA 3+75 "

TEST DATA

Test No.	3	6	9	12	15					
Soil No.										
Probe Depth, in.	0	0	0	0	0					
Time Interval, min.	1	1	1	1	1					
Aver. Density Count	629	685	625	595	607					
Aver. Moisture Count	180	157	198	186	190					
Density Ratio	-	-	-	-	-					
Moisture Ratio	-	-	-	-	-					
Wet Density, pcf	138.7	132.9	139.1	142.7	141.2					
Weight of Water, pcf	20.7	18.6	22.2	21.5	21.7					
Dry Density, pcf	117.9	114.3	116.9	121.3	119.5					
Moisture Content, %	17.6	16.3	18.9	17.7	18.1					
Control Density, pcf	106.3	→	→	→	→					
Opt. Moisture, %	18.1	→	→	→	→					
% Compaction				114.0	112.4					
Results				P	P					

P: Test Passed F: Test Failed R: Retest of Failed Area

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NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION
Client: VERSAR INC.
Inspector: CHRIS ENGLISH
Density Standard: 2595 Moisture Standard: 743

Job No: L6052.A0
Date Tested: 7-23-96
Page: 1 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
1	LIFT #3	12"	STA 0+50 20'L of CENTERLINE
4	"	"	STA 1+00 " "
7	"	"	STA 2+00 " "
10	"	"	STA 3+00 " "
13	"	"	STA 3+75 " "
14	"	"	STA 3+75 ℄
2	"	"	STA 0+50 "
5	"	"	STA 1+00 "
8	"	"	STA 2+00 "
11	"	"	STA 3+00 "

↓ ADDITIONAL COMPACTION

TEST DATA

Test No.	1	4	7	10	13	14	2	5	8	11
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	765	735	595	636	718	570	625	622	639	585
Aver. Moisture Count	161	152	102	120	171	258	227	227	226	240
Density Ratio	—	—	—	—	—	—	—	—	—	—
Moisture Ratio	—	—	—	—	—	—	—	—	—	—
Wet Density, pcf	126.6	125.6	141.0	136.2	134.9	146.0	139.2	139.6	137.7	144.0
Weight of Water, pcf	18.7	16.4	19.9	23.2	29.2	27.2	24.2	24.4	24.2	27.2
Dry Density, pcf	107.8	109.2	121.1	113.9	105.6	118.4	114.1	115.2	113.5	116.8
Moisture Content, %	17.5	16.2	16.1	19.2	21.8	22.9	22.0	21.2	21.3	23.3
Control Density, pcf	106.5	→								→
Opt. Moisture, %	18.1	→								→
% Compaction	100.8	103.9	113.7	108.8	101.1	111.1	107.1	108.2	106.6	109.7
Results	P	P	P	P	P	F	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

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LIFT #3

Moisture / Density Worksheet

Project No. L6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description SOIL/BENTONITE/CEMENT MIX

Tested by: CEF Date: 7-22-96 Calculated by: CEF Checked by: _____

Bag Number	STA 2+00 25' R of ℄		STA 1+00 25' R of ℄		STA 1+00 5' R of ℄		STA 2+00 5' R of ℄		STA 1+00 25' R of ℄	
Wt. of wet soil and mold, lbs.									6095	
Wt. of mold, lbs.									4197	
Wt. of wet soil, lbs [W_{sw}]									1898	
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]									125.5 *	
Pocket Pen., tsf										
Tare No.	NEW		OLD		NEW		OLD		OLD	
Wt. of tare, gms.	274		227		274		227		227	
Wt. of wet sample & tare, gms.	421		350		390		363		364	
Wt. of dry sample & tare, gms.	402		334		373		338		343	
Moisture content, %	14.8		15.0		17.2		22.5		18.1	
Avg. moisture contents, %										
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]									106.3	

* $\frac{1898\ g}{0.0333\ ft^3} \times \frac{1}{454}\ LB/g = 125.5\ PCF$

PATRICK ENGINEERING, INC.

PATRICK
ENGINEERING INC.

PROJECT NO. L6052.A0

PROJECT P.A.L. REMEDIATION - DAVENPORT, IA

CALCULATED BY CEF DATE 7-20-96

CHECKED BY _____ DATE _____

SHEET 1 OF 1

TITLE CALCULATION OF MOISTURE CORRECTION FACTOR (LIFT #3)

THE FOLLOWING MOISTURE CONTENT VALUES WERE RECORDED FROM SOIL/BENTONITE/CEMENT MIXTURE ON LIFT #3 (PRIOR TO COMPACTION EXCEPT WHERE NOTED):

STATION	OFFSET FROM CENTERLINE	% M OVENDRY	% M GAUGE	$\%M_O - \%M_G$
1+00	25' RIGHT	15.0	8.3	6.7
2+00	25' RIGHT	14.8	10.8	4.0
2+00	5' RIGHT	22.5	15.1	7.4
1+00	5' RIGHT	17.2	10.5	6.7
1+00*	25' RIGHT	18.1	7.4	10.7
AVERAGES:		17.5	10.4	7.1

FROM TROXLER OPERATING MANUAL:

$$\text{MOISTURE CORRECTION (MC)} = \frac{\%M_O - \%M_G}{100 + \%M_G} \times 100$$

$$= \frac{7.1}{100 + 10.4} \times 100$$

$$MC = 6.4$$

AN MC VALUE OF 6.4 WAS APPLIED TO ALL MOISTURE CONTENTS MEASURED ON LIFT #3.

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION DAVENPORT, IA
Client: VERSAR, INC.
Inspector: CHRIS ENGLISH
Density Standard: 2593 Moisture Standard: 731

Job No: 16052.A0
Date Tested: 7-25-96
Page: 1 of 2
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
2	Lift 4	12"	STA 0+50 LIFT 4B
5	"	"	STA 1+00 "
8	"	"	STA 2+00 "
11	"	"	STA 3+00 "
14	"	"	STA 3+75 "

TEST DATA

Test No.	2	5	8	11	14					
Soil No.										
Probe Depth, in.	0	0	0	0	0					
Time Interval, min.	1	1	1	1	1					
Aver. Density Count	696	663	567	524	541					
Aver. Moisture Count	160	165	222	235	222					
Density Ratio	-	-	-	-	-					
Moisture Ratio	-	-	-	-	-					
Wet Density, pcf	132.1	135.3	146.5	152.9	150.3					
Weight of Water, pcf	16.9	17.5	22.5	23.8	22.7					
Dry Density, pcf	115.2	117.9	124.0	129.1	127.6					
Moisture Content, %	14.7	14.8	18.1	18.4	17.7					
Control Density, pcf	107.4	→			→					
Opt. Moisture, %	14.9			→						
% Compaction	100+	100+	100+	100+	100+					
Results	P	P	P	P	P					

P: Test Passed F: Test Failed R: Retest of Failed Area

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NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. DAVENPORT, IA
Client: VERSAR, INC.
Inspector: CHRIS ENGLISH
Density Standard: 2595 Moisture Standard: 743

Job No: L6052.A0
Date Tested: 7-23-96
Page: 2 of 2
Meter No.: 3411-B

Test No.	Elev.	Lift Thick.	Location
3	LIFT #4	12"	STA 0+50 20' R OF CENTERLINE
6	"	"	STA 1+00 " "
9	"	"	STA 2+00 " "
12	"	"	STA 3+00 " "
15	"	"	STA 3+75 " "
1	"	"	STA 0+50 20' L OF CENTERLINE
4	"	"	STA 1+00 " "
7	"	"	STA 2+00 " "
10	"	"	STA 3+00 " "
13	"	"	STA 3+75 " "

TEST DATA

Test No.	3	6	9	12	15	1	4	7	10	13
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	660	701	769	658	641	815	704	703	555	626
Aver. Moisture Count	137	135	126	141	144	138	128	155	209	172
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	139.8	131.8	125.9	136.0	138	122.3	131.5	131.5	148.4	139.4
Weight of Water, pcf	13.0	12.7	11.8	13.3	13.6	12.7	12.1	14.3	19.0	15.9
Dry Density, pcf	122.9	119.1	114.1	122.7	124.3	109.6	119.4	117.2	129.3	123.5
Moisture Content, %	10.6	10.7	10.4	10.8	10.9	11.6	10.2	12.2	14.7	12.8
Control Density, pcf	111.1	←								→
Opt. Moisture, %	10.3	←								→
% Compaction	110.6	107.2	102.7	110.4	111.9	98.6	107.5	105.5	116.4	111.1
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

[redacted] FOR LIFT #4

Moisture / Density Worksheet

Project No. L 6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft3 ☐ 6 inch (# 2) = 0.0748 ft3

Sample No. _____ Soil Description SOIL / BENTONITE / CEMENT MIX

Tested by: CEE Date: 7-23-96 Calculated by: CEE Checked by: _____

	After Compaction									
Bag Number	STA 1+00 20' R OF ℄									
Wt. of wet soil and mold, lbs.	6050									
Wt. of mold, lbs.	4197									
Wt. of wet soil, lbs [W_{sw}]	1853									
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]	122.6 *									
~~Pocket Pen., tsf~~										
Tare No.	OLD									
Wt. of tare, gms.	227									
Wt. of wet sample & tare, gms.	409									
Wt. of dry sample & tare, gms.	392									
Moisture content, %	(10.3)									
Avg. moisture contents, %	(111.1)									
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]										

$$\frac{1853\,g}{0.0333\,ft^3} \times \frac{1}{454}\ LB/g = 122.6\ LB/FT$$

PATRICK ENGINEERING, INC.

LIFT #4

Moisture / Density Worksheet

Project No. L6052 AD

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description SOIL / BENTONITE / CEMENT MIXTURE

Tested by: CEE Date: 7-23-96 Calculated by: CEE Checked by: _____

	PRE-COMPACTION	PRE-COMPACTION	PRE-COMPACTION	PRE-COMPACTION	PRE-COMPACTION
Bag Number	STA 1+00 20' N of ℄	STA 3+00 20' R of ℄	STA 0+25 20' R of ℄	STA 1+50 20' R of ℄	STA 1+00 20' R OF ℄
Wt. of wet soil and mold, lbs.					
Wt. of mold, lbs.					
Wt. of wet soil, lbs [W_{sw}]					
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]					
Pocket Pen., tsf					
Tare No.	NEW	NEW	OLD	OLD	OLD
Wt. of tare, gms.	274	274	227	227	227
Wt. of wet sample & tare, gms.	418	427	327	404	382
Wt. of dry sample & tare, gms.	406	412	316	383	367
Moisture content, %	9.1	10.9	12.4	13.5	10.7
Avg. moisture contents, %					
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]					

NUCLEAR GAUGE = MOISTURE CONTENT 7.0 7.7 8.6 9.9 8.8

PATRICK ENGINEERING, INC.

PATRICK
ENGINEERING INC.

PROJECT NO. L6052.A6
PROJECT P.A.L. REMEDIATION - DAVENPORT, IA
CALCULATED BY CEE DATE 7-23-96
CHECKED BY _____ DATE _____
SHEET _____ OF _____

CALCULATION OF MOISTURE CORRECTION FACTOR
LIFT #4

THE FOLLOWING MOISTURE CONTENTS WERE RECORDED FROM LIFT #4 (ALL MEASUREMENTS WERE MADE PRIOR TO COMPACTION):

STATION	OFFSET FROM CENTERLINE	% M OVENDRY	% M GAUGE	$\%M_o - \%M_G$
1+00	20'R	9.1	7.0	2.1
3+00	20'R	10.9	7.7	3.2
0+25	20'R	12.4	8.6	3.8
1+50	20'R	13.5	9.9	3.6
1+00	20'R	10.7	8.8	1.9
AVERAGES:		11.3	8.4	2.9

FROM TROXLER 3411-B INSTRUCTION MANUAL:

$$\text{MOISTURE CORRECTION FACTOR (MC)} = \frac{\%M_o - \%M_G}{100 + \%M_G} \times 1000$$

$$= \frac{2.9}{100 + 8.4} \times 1000$$

$$MC = 27$$

THIS VALUE WAS APPLIED TO ALL GAUGE MOISTURE CONTENTS MEASURED ON LIFT #4.

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. DAVENPORT, IA
Client: VERSAR, INC.
Inspector: CHRIS ENGLISH
Density Standard: 2593 Moisture Standard: 731

Job No: L6052.AO
Date Tested: 7-25-96
Page: 2 of 2
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
3	12"	Lift 5	STA 0+50 LIFT 5C
6	"	"	STA 1+00 "
9	"	"	STA 2+00 "
12	"	"	STA 3+00 "
15	"	"	STA 3+75 "
1	"	"	STA 0+50 LIFT 5A
4	"	"	STA 1+00 "
7	"	"	STA 2+00 "
10	"	"	STA 3+00 "
13	"	"	STA 3+75 "

TEST DATA

Test No.	3	6	9	12	15	1	4	7	10	13
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	639	623	565	598	603	580	685	722	778	729
Aver. Moisture Count	144	159	168	144	145	166	140	163	132	167
Density Ratio	—	—	—	—	—	—	—	—	—	—
Moisture Ratio	—	—	—	—	—	—	—	—	—	—
Wet Density, pcf	138.0	139.7	137.0	142.8	142.2	145.0	133.2	129.7	125.1	129.1
Weight of Water, pcf	15.9	17.2	19.2	16.1	16.2	18.0	15.4	17.1	14.4	17.4
Dry Density, pcf	122.1	122.5	129.8	126.7	126.0	127.0	117.8	112.6	110.7	111.7
Moisture Content, %	13.0	14.0	14.1	12.7	12.8	14.1	13.1	15.2	13.0	15.5
Control Density, pcf	107.4	—								→
Opt. Moisture, %	19.9	—								→
% Compaction	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

LIFT #5

Moisture / Density Worksheet

Project No. 46052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description SOIL / CEMENT / BENTONITE MIX

Tested by: CEE Date: 7/25/96 Calculated by: CEE Checked by: _____

ONE-PT PROCTOR

Bag Number	STA 0+25 10'R of ℄				STA 1+00 10'L of ℄					
Wt. of wet soil and mold, lbs.	6128									
Wt. of mold, lbs.	4197									
Wt. of wet soil, lbs [Wsw]	1931									
Wet unit weight, pcf [γwet = (Wsw ÷ mold vol.)]	127.7									
Pocket Pen., tsf										
Tare No.	OLD				OLD					
Wt. of tare, gms.	227				227					
Wt. of wet sample & tare, gms.	334				315					
Wt. of dry sample & tare, gms.	317				300					
Moisture content, %	18.9				20.5					
Avg. moisture contents, %					20.5					
Dry unit weight, pcf [γwet ÷ (1+(WC%÷100))]	107.4									

$$\frac{1931\ g}{0.0333\ FT^3} \times \frac{1}{454}\ \frac{LB}{g} = 127.7\ LB/FT^3$$

PATRICK ENGINEERING, INC.

PATRICK ENGINEERING INC.

PROJECT NO. L6052.A0

PROJECT P.A.L. REMEDIATION - DAVENPORT, IA

CALCULATED BY CEE DATE 7-25-96

CHECKED BY _____ DATE _____

SHEET 1 OF 1

SUBJECT CALCULATION OF MOISTURE CORRECTION FACTOR LIFT #5

THE FOLLOWING MOISTURE CONTENTS WERE RECORDED FROM LIFT #5. (ALL MEASUREMENTS WERE MADE PRIOR TO COMPACTION):

STATION	OFFSET FROM CENTERLINE	% M OVENDRY	% M GAUGE	$\%M_O - \%M_G$
0+25	10' R	18.9	13.4	5.5
1+00	10' L	20.5	15.7	4.8
AVERAGES:		19.7	14.5	5.2

FROM TROXLER 3411-B INSTRUCTION MANUAL:

$$\text{MOISTURE CORRECTION FACTOR (MCF)} = \frac{\%M_O - \%M_G}{100 + \%M_G} \times 1000$$

$$= \frac{5.2}{100 + 14.5} \times 1000$$

MCF = .45

THIS MCF WAS APPLIED TO ALL GAUGE MOISTURE CONTENTS MEASURED ON LIFT #5.

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT, IA
Job No: L6052.AD
Client: VERSAR, INC.
Date Tested: 7-26-96
Inspector: CHRIS ENGLISH
Page: 1 of 3
Density Standard: 2548 Moisture Standard: 746
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
1	LIFT #1	12"	STA 0+50 #6 A
2	"	"	" #6 B
3	"	"	" #6 C
4	"	"	STA 1+00 #6 A
5	"	"	" #6 B
6	"	"	" #6 C
7	"	"	STA 2+00 #6 A
8	"	"	" #6 B
9	"	"	" #6 C
10	"	"	STA 3+00 #6 A

MC = 50

V. WET HERE ↓

TEST DATA

Test No.	1	2	3	4	5	6	7	8	9	10
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	630	718	666	587	763	685	626	629	654	640
Aver. Moisture Count	180	126	161	214	138	172	243	173	158	286
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	138.7	130.1	134.9	143.8	126.2	133.2	136.9	138.9	136.2	137.2
Weight of Water, pcf	19.1	14.5	17.4	22.0	15.2	14.3	21.0	18.6	17.3	27.3
Dry Density, pcf	119.6	115.6	117.5	121.8	110.9	118.9	114.9	120.3	118.9	109.9
Moisture Content, %	16.0	12.5	14.8	18.1	13.7	12.1	20.9	15.4	14.5	24.8
Control Density, pcf	1078	———	———	———	———	———	———	———	———	——→
Opt. Moisture, %	13.6	———	———	———	———	———	———	———	———	——→
% Compaction	109.9	106.3	108.0	111.9	101.9	109.3	105.6	110.0	109.3	101.0
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

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BACK FILL [illegible] SOME REACTION ON SURFACE

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT IA Job No: L6052.A0

Client: VERSAR, INC. Date Tested: 7-26-96

Inspector: CHRIS ENGLISH Page: 2 of 3

Density Standard: 2588 Moisture Standard: 746 Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
11	LIFT #6	12"	STA 3+00 #6 B
12	"	"	" #6 C
13	"	"	STA 3+75 #6 A
14	"	"	" #6 B
15	"	"	" #6 C
8 5" CUT	"	"	STA 2+00 #6 B 5" BELOW TOP OF LIFT
12 5" CUT	"	"	STA 3+00 #6 C " "
6 5" CUT	"	"	STA 1+00 #6 C " "
16 5" CUT	"	"	STA 3+50 #6 C " "
7 5" CUT	"	"	STA 2+00 #6 A " "

MC = 50

TEST DATA

Test No.	11	12	13	14	15	8 5" CUT	12 5" CUT	6 5" CUT	16 5" CUT	7 5" CUT
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	713	663	607	733	638	763	738	679	814	676
Aver. Moisture Count	144	138	245	163	184	175	140	120	138	135
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	130.5	135.3	141.2	128.0	137.8	126.0	128.3	133.8	122.2	134.0
Weight of Water, pcf	15.9	15.7	24.3	17.3	19.4	18.1	12.8	14.2	15.1	15.4
Dry Density, pcf	111.5	119.6	116.9	111.3	118.4	107.9	15.5	119.6	107.2	118.6
Moisture Content, %	13.9	13.1	20.8	15.5	16.4	16.8	13.1	11.9	14.0	13.0
Control Density, pcf	108.8	→	→	→	→					
Opt. Moisture, %	13.6	→	→	→	→					
% Compaction	105.2	109.9	107.4	102.3	106.8	99.2	103.6	119.6	98.5	109.0
Results	P	P		P	P	P	P	P	P	

P: Test Passed F: Test Failed R: Retest of Failed Area

ref: h\basefile\forms\nukeform.doc

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT, IA
Client: VERSAR, INC.
Inspector: CHRIS ENGLISH
Density Standard: 2588 Moisture Standard: 746

Job No: L6052.A0
Date Tested: 7-26-96
Page: 3 of 3
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
45 CUT	LIFT #6	12"	STA 1+00 #6A 5" BELOW TOP OF LIFT

MC = 50

TEST DATA

Test No.	45 CUT										
Soil No.											
Probe Depth, in.	0										
Time Interval, min.	1										
Aver. Density Count	629										
Aver. Moisture Count	185										
Density Ratio	-										
Moisture Ratio	-										
Wet Density, pcf	138.6										
Weight of Water, pcf	19.5										
Dry Density, pcf	119.3										
Moisture Content, %	16.3										
Control Density, pcf	108.8										
Opt. Moisture, %	13.6										
% Compaction	109.7										
Results	P										

P: Test Passed F: Test Failed R: Retest of Failed Area

ref: h\basefile\forms\nukeform.doc

LIFT #6

Moisture / Density Worksheet

Project No. L6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft3 ☐ 6 inch (# 2) = 0.0748 ft3

Sample No. _____ Soil Description SOIL / CEMENT / BENTONITE MIX

Tested by: CEE Date: 7-26-96 Calculated by: CEE Checked by: _____

Bag Number	STA 0+50 #6C		STA 1+00 #6C		STA 0+50 #6C		STA 2+00 #6C		STA 1+00 #6C	
Wt. of wet soil and mold, lbs.									6067	
Wt. of mold, lbs.									4.97	
Wt. of wet soil, lbs [Wsw]									1670	
Wet unit weight, pcf [γwet = (Wsw ÷ mold vol.)]									123.7	
~~Pocket Pen., tsf~~										
Tare No.	NEW		OLD		OLD		NEW		NEW	
Wt. of tare, gms.	274		227		227		274		274	
Wt. of wet sample & tare, gms.	343		318		299		367		324	
Wt. of dry sample & tare, gms.	334		306		291		353		318	
Moisture content, %	(15.0)		(15.2)		(12.5)		(17.7)		(13.6)	
Avg. moisture contents, %										
Dry unit weight, pcf [γwet ÷ (1+(WC%÷100))]									(108.9)	

$$\frac{1890g}{0.0333\ ft^3} \times \frac{1}{454}\ LB/g = 123.7\ PCF$$

$$\frac{123.7\ PCF}{1 + 0.136} = 108.9\ PCF$$

PATRICK ENGINEERING, INC.

ATRICK
IGINEERING INC.

PROJECT NO. 46052.A0
PROJECT P.A.L. REMEDIATION - DAVENPORT, IA
CALCULATED BY SEE DATE 7-26-96
CHECKED BY ____ DATE ____
SHEET 1 OF 1

CALCULATION OF MOISTURE CORRECTION FACTOR (LIFT #6)

THE FOLLOWING FIELD MEASUREMENTS WERE MADE ON UNCOMPACTED SOIL/CEMENT/BENTONITE ON LIFT #6:

STATION	OFFSET	$\%M_{OVENDRY}$	$\%M_{NUCLEAR\ GAUGE}$	$\%M_o - \%M_G$
0+50	#6C	15.0	8.2	6.8
1+00	#6C	15.2	8.6	6.6
0+50	#6C	12.5	9.5	3.0
2+00	#6C	17.7	11.4	6.3
1+00	#6C	13.6	8.9	4.7
AVERAGES:		14.8	9.3	5.5

NOTE: MEASUREMENTS MADE AT THE SAME LOCATION WERE TAKEN AFTER DIFFERENT NUMBER OF WATER TRUCK PASSES (i.e. AT DIFFERENT MOISTURE CONTENTS)

FROM TROXLER INSTRUCTION MANUAL:

$$\text{MOISTURE CORRECTION FACTOR (MCF)} = \frac{\%M_o - \%M_G}{100 + \%M_G} \times 1000$$

$$= \frac{5.5}{100 + 9.3} \times 1000$$

MCF = 50

AN MCF OF 50 WAS APPLIED TO ALL MOISTURE CONTENT MEASUREMENTS OBTAINED ON LIFT #6 USING THE NUCLEAR DENSITY GAUGE.

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT, IA Job No: L6052.A0

Client: VERSAR, INC. Date Tested: 7-29-96

Inspector: CHRIS ENGLISH Page: 1 of 2

Density Standard: 2585 Moisture Standard: 739 Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
1	LIFT #7	10"	STA 0+50 5' L OF ℄
2	"	"	" 5' R "
3	"	"	STA 1+00 5' L "
4	"	"	" 5' R "
5	"	"	STA 2+00 5' L "
6	"	"	" 5' R "
7	"	"	STA 3+00 5' L "
8	"	"	" 5' R "
9	"	"	STA 3+75 5' L "
10	"	"	" 5' R "

TEST DATA

Test No.	1	2	3	4	5	6	7	8	9	10
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	659	663	729	636	693	577	570	762	564	598
Aver. Moisture Count	165	180	131	148	147	163	181	126	200	186
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	135.6	135.4	129.0	138.1	132.2	145.2	146.0	126.2	146.8	142.4
Weight of Water, pcf	17.3	21.6	14.4	16.1	15.8	17.6	19.5	13.9	20.6	19.3
Dry Density, pcf	118.2	120.9	114.6	122.0	116.5	127.6	126.5	112.4	126.2	123.1
Moisture Content, %	14.7	17.1	12.5	13.2	13.5	13.8	15.4	12.3	16.3	15.7
Control Density, pcf	118.0	—								→
Opt. Moisture, %	12.5									→
% Compaction	100.2	102.4	97.1	103.4	98.7	108.1	107.2	95.2	106.9	104.3
Results	P	P	(F)	P	P	P	P	(F)	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

ref: h\basefile\forms\nukeform.doc

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L - DAVENPORT, IA
Client: VERSAR, INC
Inspector: CHRIS ENGLISH
Density Standard: 2585 Moisture Standard: 739

Job No: L6052.A0
Date Tested: 7-29-96
Page: 2 of 2
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
3.2	LIFT #1	10"	STA 1+00 5' L OF ℄ -- AFTER 4ORS PASSES
8.2	"	"	STA 3+00 " R " " "

TEST DATA

Test No.	3.2	8.2								
Soil No.										
Probe Depth, in.	0	0								
Time Interval, min.	1	1								
Aver. Density Count	628	760								
Aver. Moisture Count	130	121								
Density Ratio	-	-								
Moisture Ratio	-	-								
Wet Density, pcf	139.1	126.4								
Weight of Water, pcf	14.7	13.5								
Dry Density, pcf	124.3	112.9								
Moisture Content, %	11.8	11.9								
Control Density, pcf	118.0	→								
Opt. Moisture, %	12.5	→								
% Compaction	105.3	95.7								
Results	R/P	R/F								

P: Test Passed F: Test Failed R: Retest of Failed Area

LIFT #7

Moisture / Density Worksheet

Project No. L6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description _____

Tested by: CEE Date: 7-29-96 Calculated by: CEE Checked by: _____

STD. PROCTOR

Bag Number	1+50 5'L OF ℄		0+25 5'R OF ℄		1+00 5'L OF ℄		1+50 ℄			
Wt. of wet soil and mold, ~~lbs.~~ g							6205 g			
Wt. of mold, ~~lbs.~~ g							4197			
Wt. of wet soil, ~~lbs~~ g [W_{sw}]							2008			
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]							132.8*			
~~Pocket Pen., tsf~~										
Tare No.	OLD		NEW		NEW		NEW			
Wt. of tare, gms.	227		274		274		274			
Wt. of wet sample & tare, gms.	321		327		342		328			
Wt. of dry sample & tare, gms.	312		318		334		322			
Moisture content, %	(10.6)		(20.5)		(13.3)		(12.5)			
Avg. moisture contents, %										
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]							(118.0)			

* $\frac{2008\ g}{0.0333\ FT^3} \times \frac{1}{454}\ LB/g = 132.8\ LB/FT^3$

PATRICK ENGINEERING, INC.

PATRICK ENGINEERING INC.

PROJECT NO. L6052.A0

PROJECT P.A.L. REMEDIATION - DAVENPORT, IA

CALCULATED BY CEE DATE 7-29-96

CHECKED BY _____ DATE _____

SHEET 1 OF 1

CALCULATION OF MOISTURE CORRECTION FACTOR: LIFT #7

THE FOLLOWING FIELD MEASUREMENTS WERE MADE ON UNCOMPACTED SOIL/CEMENT/BENTONITE/WATER MIXTURE ON LIFT #7:

STATION	OFFSET	$\%M_{OVENDRY}$	$\%M_{GAUGE}$	$\%M_o - \%M_G$
1+50	5' L OF ℄	10.6	6.3	4.3
0+25	5' R OF ℄	20.5	13.9	6.6
1+00	5' L OF ℄	13.3	9.3	4.0
1+50	℄	12.5	7.9	4.6
	AVERAGES:	14.2	9.4	4.9

FROM TROXLER INSTRUCTION MANUAL:

$$MCF = \frac{\%M_o - \%M_G}{100 + \%M_G} \times 1000$$

$$= \frac{4.9}{100 + 9.4} \times 1000$$

MCF = 45

AN MCF OF 45 WAS APPLIED TO ALL MOISTURE CONTENT MEASUREMENTS MADE ON LIFT #7 USING THE NUCLEAR DENSITY GAUGE.

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT, IA
Job No: L6052.A0
Client: VERSAR, INC.
Date Tested: 7-30-96
Inspector: CHRIS ENGLISH
Page: 1 of 1
Density Standard: 2603 Moisture Standard: 745
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
1	SAND LAYER	6"	STA 0+50 5' L OF ℄
2	"	"	" 5' R "
3	"	"	STA 1+00 5' L "
4	"	"	" 5' R "
5	"	"	STA 2+00 5' L "
6	"	"	" 5' R "
7	"	"	STA 3+00 5' L "
8	"	"	" 5' R "
9	"	"	STA 3+75 5' L "
10	"	"	" 5' R "

TEST DATA

Test No.	1	2	3	4	5	6	7	8	9	10
Soil No.										
Probe Depth, in.	0	0	0	0	0	0	0	0	0	0
Time Interval, min.	1	1	1	1	1	1	1	1	1	1
Aver. Density Count	1138	1165	1114	1159	1123	1131	1144	1218	1085	1084
Aver. Moisture Count	82	80	87	76	99	74	57	61	84	77
Density Ratio	-	-	-	-	-	-	-	-	-	-
Moisture Ratio	-	-	-	-	-	-	-	-	-	-
Wet Density, pcf	104.1	102.8	105.2	103.1	104.7	104.4	103.9	100.6	106.6	106.6
Weight of Water, pcf	5.1	5.0	5.5	4.6	6.5	4.5	3.1	3.4	5.3	4.7
Dry Density, pcf	98.9	97.8	99.6	98.9	98.1	99.9	100.8	97.2	101.3	101.9
Moisture Content, %	5.2	5.1	5.6	4.7	6.6	4.5	3.1	3.5	5.2	4.6
Control Density, pcf	104.8	—								→
Opt. Moisture, %	6.9	—								→
% Compaction	94.3	93.3	95.0	93.9	93.6	95.3	96.1	92.7	96.6	97.2
Results	P	P	P	P	P	P	P	P	P	P

P: Test Passed F: Test Failed R: Retest of Failed Area

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SAND LAYER

Moisture / Density Worksheet

Project No. 46052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft³ ☐ 6 inch (# 2) = 0.0748 ft³

Sample No. _____ Soil Description COARSE SAND, POORLY GRADED

Tested by: CEE Date: 7-30-96 Calculated by: CEE Checked by: _____

STD. PROCTOR TEST FOR SAND

Bag Number											
Wt. of wet soil and mold, ~~lbs.~~ g	5892										
Wt. of mold, ~~lbs.~~ g	4197										
Wt. of wet soil, ~~lbs~~ [W_{sw}] g	1695										
Wet unit weight, pcf [$\gamma_{wet} = (W_{sw} \div \text{mold vol.})$]	112.1 *										
Pocket Pen., tsf											
Tare No.	NEW										
Wt. of tare, gms.	274										
Wt. of wet sample & tare, gms.	382										
Wt. of dry sample & tare, gms.	375										
Moisture content, %	(6.9)										
Avg. moisture contents, %											
Dry unit weight, pcf [$\gamma_{wet} \div (1+(WC\% \div 100))$]	(104.8)										

$$* \frac{1695\ g}{0.0333\ FT^3} \times \frac{1}{454}\ LB/g = 112.1\ LB/FT^3$$

NUCLEAR DENSITY TEST DATA

PATRICK ENGINEERING INC.

Project: P.A.L. REMEDIATION - DAVENPORT, IA
Job No: L6052.A0
Client: VERSAR, INC.
Date Tested: 8-7-96
Inspector: CHRIS ENGLISH
Page: 1 of 1
Density Standard: 2596 Moisture Standard: 743
Meter No.: TROXLER 3411-B

Test No.	Elev.	Lift Thick.	Location
1	TOPSOIL	6"	STA 1+00 - RIGHT SLOPE

TEST DATA

Test No.	1									
Soil No.										
Probe Depth, in.	0									
Time Interval, min.	1									
Aver. Density Count	1202									
Aver. Moisture Count	168									
Density Ratio	-									
Moisture Ratio	-									
Wet Density, pcf	99.4									
Weight of Water, pcf	12.2									
Dry Density, pcf	87.2									
Moisture Content, %	14.0									
Control Density, pcf	93.3									
Opt. Moisture, %	11.5									
% Compaction	93.5									
Results	P									

P: Test Passed F: Test Failed R: Retest of Failed Area

ref: h\basefile\forms\nukeform.doc

TOPSOIL FOR BERM - ONE-PT. PROCTOR

Moisture / Density Worksheet

Project No. L6052.A0

☑ Standard Proctor (ASTM D698) ☐ Modified Proctor (ASTM D1557) Method _____

Mold Volume: ☑ 4 inch (# 6) = 0.0333 ft3 ☐ 6 inch (# 2) = 0.0748 ft3

Sample No. _____ Soil Description BROWN ORGANIC SILT, TRACE C-f SAND

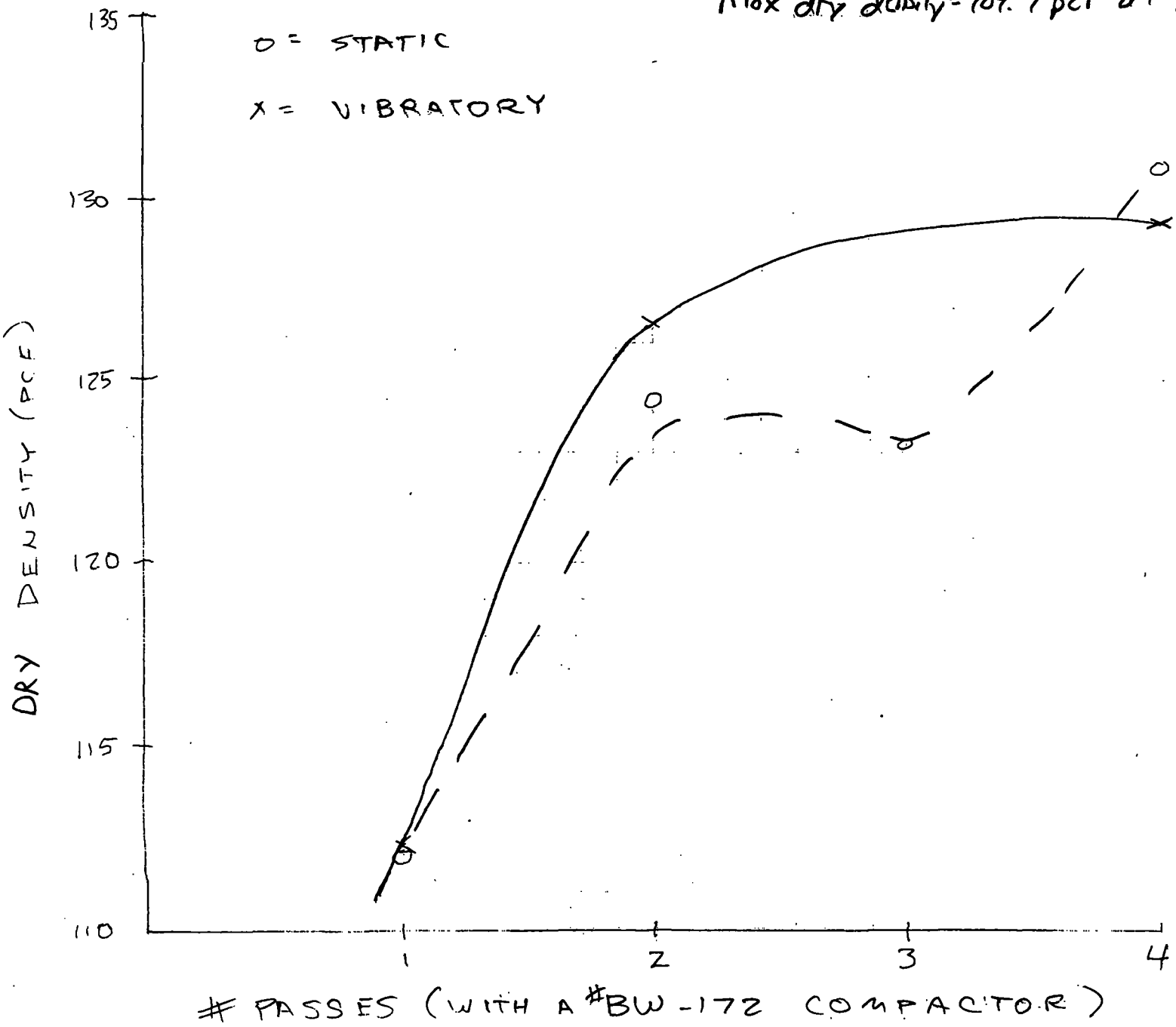
Tested by: CEE Date: 7-31-96 Calculated by: _____ Checked by: _____

Bag Number	TAKEN FROM PILE									
Wt. of wet soil and mold, ~~lbs.~~ g	5769 g									
Wt. of mold, ~~lbs.~~ g	4197 g									
Wt. of wet soil, ~~lbs~~ g [Wsw]	1572 g									
Wet unit weight, pcf [γwet = (Wsw ÷ mold vol.)]	104.0 PCF									
Pocket Pen., tsf										
Tare No.	OLD									
Wt. of tare, gms.	227									
Wt. of wet sample & tare, gms.	285									
Wt. of dry sample & tare, gms.	279									
Moisture content, %	11.5									
Avg. moisture contents, %										
Dry unit weight, pcf [γwet ÷ (1+(WC%÷100))]	93.3									

$$\frac{1572\ g}{0.0333\ FT^3} \times \frac{1}{454}\ LB/g = 104.0\ LB/FT^3$$

PATRICK ENGINEERING, INC.

Results of one-Point Standard Proctor (ASTM D698)
Max dry density = 109.7 pcf at 16.2% moisture content



Test Rolling Pattern

PROJECT PAL - Davenport, Iowa
CALCULATED BY CE DATE 7-8-96
CHECKED BY JFD DATE 7-8-96
SHEET 1 OF
PROJECT NO 6052

ATRICK
JGINEERING INC.

APPENDIX E

PERIMETER AIR MONITORING RESULTS
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

JOB = 4995/00001 VERIFICATION COPY
INDUSTRIAL HYGIENE DEPARTMENT

PAGE 1 X

RECEIVED : 06/24/96 7965 VERSAR
RELEASED : 06/25/96 ATTN: STEVE BUNSEN
REPORTED : 06/26/96 200 WEST 22ND STREET, STE. 250
WORK ORDER: 124333 LOMBARD , IL 60148

PROJECT NAME/JOB ID: P.A.L. DAVENPORT, IA
: 04668

SAMPL NUMBER		VALUE	UNITS
8544520	PDS0618D1	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:		
	PERIMETER DUST SAMPLE - DOWNWIND		
	MASS:	Less than Detection Limit.	
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	Less than Detection Limit.	
	DETECTION LIMIT:	0.014	mg/M3
	AIR VOLUME:	740	Liters
	ANALYST:	Robert Landry	
8544521	PDS0619D2	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:		
	PERIMETER DUST SAMPLE - DOWNWIND		
	MASS:	0.052	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.031	mg/M3
	AIR VOLUME:	1680	Liters
	ANALYST:	Robert Landry	
8544522	PDS0619U2	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE - UPWIND	
	MASS:	0.086	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.051	mg/M3
	AIR VOLUME:	1680	Liters
	ANALYST:	Robert Landry	
8544523	PDS0620D3	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:		
	PERIMETER DUST SAMPLE - DOWNWIND		
	MASS:	0.089	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.049	mg/M3

CONTINUED ON NEXT PAGE

= 4995/00001 VERIFICATION COPY
INDUSTRIAL HYGIENE DEPARTMENT

GE 2 X

CEIVED : 06/24/96 7965 VERSAR
LEASED : 06/25/96 ATTN: STEVE BUNSEN
EPORTED : 06/26/96 200 WEST 22ND STREET, STE. 250
ORK ORDER: 124333 LOMBARD , IL
60148

JECT NAME/JOB ID: P.A.L. DAVENPORT, IA
: 04668

NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	AIR VOLUME:	1808	Liters
	ANALYST:	Robert Landry	
44524	PD80620U3	FILTER, AIR	
1676	TOTAL WEIGHT		
TAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	MASS:	0.215	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.125	mg/M3
	AIR VOLUME:	1720	Liters
	ANALYST:	Robert Landry	
44525	PD80621D4	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	MASS:	0.412	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.434	mg/M3
	AIR VOLUME:	948	Liters
	ANALYST:	Robert Landry	
3544526	PD80621U4	FILTER, AIR	
1676	TOTAL WEIGHT		
AT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	MASS:	0.387	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.711	mg/M3
	AIR VOLUME:	544	Liters
	ANALYST:	Robert Landry	

TATIONS

Blank not submitted with sample set.
The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.
Total weight refers to the total mass of particulate present on the filter, and is not compound specific.
For particulate not otherwise classified (not covered
CONTINUED ON NEXT PAGE

WKS = 4995/00001

VERIFICATION COPY
INDUSTRIAL HYGIENE DEPARTMENT

AGE 3

X

ECEIVED : 06/24/96
RELEASED : 06/25/96
EPORTED : 06/26/96
ORK ORDER: 124333

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: P.A.L. DAVENPORT, IA
: 04668

AML NUMBER----------VALUE-----UNITS----------

CONTINUED FROM PRIOR PAGE
by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.
The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

BRYAN MASON
DIRECTOR, IND. HYGIENE

AMERICAN MEDICAL LABORATORIES, INC.®
P.O. Box 10841 • 14225 Newbrook Drive
Chantilly, VA 22021-0841
Telephone: (703) 802-6900

INDUSTRIAL HYGIENE DEPARTMENT

X

RECEIVED : 06/29/96
RELEASED : 07/09/96
REPORTED : 07/09/96
WORK ORDER: 124589

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO# 04668 P.A.L.
: DAVENPORT IA

AML NUMBER		VALUE	UNITS
8546033	PDS0624U5	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-24-96	
	MASS:	0.030	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.039	mg/M3
	AIR VOLUME:	760	Liters
	ANALYST:	Don Johnsey	
8546034	PDS0624D5	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-24-96	
	MASS:	0.019	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.029	mg/M3
	AIR VOLUME:	640	Liters
	ANALYST:	Don Johnsey	
8546035	PDS0625D6	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-25-96	
	MASS:	0.105	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.061	mg/M3
	AIR VOLUME:	1740	Liters
	ANALYST:	Don Johnsey	
8546036	PDS0625U6	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-25-96	
	MASS:	0.053	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.034	mg/M3
	AIR VOLUME:	1536	Liters
	ANALYST:	Don Johnsey	

CONTINUED ON NEXT PAGE

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PROJECT NAME/JOB ID: PO# 04668 P.A.L.
: DAVENPORT IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
8546037	PDS0626D7	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	MASS:	0.369	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.513	mg/M3
	AIR VOLUME:	720	Liters
	ANALYST:	Don Johnsey	
8546038	PDS0626U7	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	MASS:	0.571	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.444	mg/M3
	AIR VOLUME:	1288	Liters
	ANALYST:	Don Johnsey	
8546039	WDS0626L1	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERSONAL WORKER DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	MASS:	2.69	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	3.80	mg/M3
	AIR VOLUME:	710	Liters
	ANALYST:	Don Johnsey	
2878	METALS PROFILE-3		
STAT	SITE/LOCATION:	PERSONAL WORKER DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	AIR VOLUME:	710	Liters
	ANALYTE:	Lead [7439-92-1]	
	MASS:	68.0	ug
	QUANTITATION LIMIT:	2.0	ug
	CONCENTRATION:	95.8	ug/M3
	CONTINUED ON NEXT PAGE		

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PROJECT NAME/JOB ID: PO# 04668 P.A.L.
: DAVENPORT IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	ANALYTE:	Cadmium [7440-43-9]	
	MASS:	5.03	ug
	QUANTITATION LIMIT:	0.20	ug
	CONCENTRATION:	7.07	ug/M3
	ANALYTE:	Nickel (7440-02-2)	
	MASS:	0.0163	mg
	QUANTITATION LIMIT:	0.0010	mg
	CONCENTRATION:	0.0230	ug/M3
	ANALYST:	Earl Callender	
8546040	WDS0626H1	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERSONAL DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	MASS:	0.899	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	1.21	mg/M3
	AIR VOLUME:	744	Liters
	ANALYST:	Don Johnsey	
2878	METALS PROFILE-3		
STAT	SITE/LOCATION:	PERSONAL DUST SAMPLE	
	DATE COLLECTED:	6-26-96	
	AIR VOLUME:	744	Liters
	ANALYTE:	Lead [7439-92-1]	
	MASS:	2.5	ug
	QUANTITATION LIMIT:	2.0	ug
	CONCENTRATION:	3.4	ug/M3
	ANALYTE:	Cadmium [7440-43-9]	
	MASS:	0.26	ug
	QUANTITATION LIMIT:	0.20	ug
	CONCENTRATION:	0.35	ug/M3
	ANALYTE:	Nickel (7440-02-2)	
	MASS:	0.0032	mg
	QUANTITATION LIMIT:	0.0010	mg
	CONCENTRATION:	0.0043	mg/M3
	ANALYST:	Earl Callender	

NOTATIONS

The analysis for Total Weight is performed by a
CONTINUED ON NEXT PAGE

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: DAVENPORT IA

AML NUMBER----------VALUE-----UNITS----------

CONTINUED FROM PRIOR PAGE
gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

Analysis was performed via a modified OSHA-125, an inductively coupled argon plasma (ICAP) technique.

As per 29 CFR 1910.1025, the Permissible Exposure Limit (PEL) for lead in air is 50 ug/M3 as an 8 hour time weighted average (TWA). The PEL according to the "Lead Exposure in Construction: Interm Final Rule", (29 CFR 1926.62) has an action level of 30 ug/M3, and a PEL of 50 ug/M3, both as an 8 hour TWA.

As per 29 CFR 1910.1027, the Permissible Exposure Limit (PEL) for cadmium [7440-43-9] is 5 ug/M3 as an 8 hour time weighted average (TWA). The action level for cadmium is 2.5 ug/M3 as an 8 hour TWA.

The transitional and final rule limits for nickel as insoluble compound and metal are 1 mg/M3 expressed as an 8 hour time weighted average (TWA). Soluble nickel compounds have a transitional limit of 1 mg/M3 and a final rule limit of 0.1 mg/M3, both expressed as an 8 hour TWA. Nickel carbonyl has transitional and final rule limits of 0.007 mg/M3 expressed as an 8 hour TWA.

CONTINUED ON NEXT PAGE

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PROJECT NAME/JOB ID: PO# 04668 P.A.L.
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AML NUMBER----------VALUE-----UNITS----------

CONTINUED FROM PRIOR PAGE

Blank not submitted with sample set.

*** FINAL REPORT ***

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INDUSTRIAL HYGIENE DEPARTMENT

RECEIVED : 07/05/96
RELEASED : 07/06/96
REPORTED : 07/07/96
WORK ORDER: 124870

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO 04668 PAL
: DAVENPORT IOWA

AML NUMBER		VALUE	UNITS
8547207	PDS0627D8	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION: DOWNWIND PERIMETER DUST SAMPLE (PDS)		
	DATE COLLECTED:	6-27-97	
	MASS:	0.487	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.284	mg/M3
	AIR VOLUME:	1,712	Liters
	ANALYST:	Grace Borders	
8547208	PDS0627U8	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PDS	
	DATE COLLECTED:	6-27-96	
	MASS:	0.651	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.409	mg/M3
	AIR VOLUME:	1,592	Liters
	ANALYST:	Grace Borders	
8547209	PDS0628D9	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	D PDS	
	DATE COLLECTED:	6-28-96	
	MASS:	0.619	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.632	mg/M3
	AIR VOLUME:	980	Liters
	ANALYST:	Grace Borders	
8547210	PDS0628U9	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	U PDS	
	DATE COLLECTED:	6-28-96	
	MASS:	0.723	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.393	mg/M3
	AIR VOLUME:	1,840	Liters

CONTINUED ON NEXT PAGE

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ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO 04668 PAL
: DAVENPORT IOWA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	ANALYST:	Grace Borders	
8547211	PDS0629D10	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	D PDS	
	DATE COLLECTED:	6-29-96	
	MASS:	0.358	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.333	mg/M3
	AIR VOLUME:	1,076	Liters
	ANALYST:	Grace Borders	
8547212	PDS0629U10	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	U PDS	
	DATE COLLECTED:	6-29-96	
	MASS:	0.783	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.725	mg/M3
	AIR VOLUME:	1,080	Liters
	ANALYST:	Grace Borders	
8547213	PDS0701D11	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	D PDS	
	DATE COLLECTED:	7-01-96	
	MASS:	0.348	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.191	mg/M3
	AIR VOLUME:	1,820	Liters
	ANALYST:	Grace Borders	
8547214	PDS0702U11	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	U PDS	
	DATE COLLECTED:	7-01-96	
	MASS:	0.198	mg
	DETECTION LIMIT:	0.010	mg
	CONTINUED ON NEXT PAGE		

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LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO 04668 PAL
: DAVENPORT IOWA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	CONCENTRATION:	0.106	mg/M3
	AIR VOLUME:	1,860	Liters
	ANALYST:	Grace Borders	
8547215	PDS0702D12	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	D PDS	
	DATE COLLECTED:	7-02-96	
	MASS:	0.138	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.077	mg/M3
	AIR VOLUME:	1,792	Liters
	ANALYST:	Grace Borders	
8547216	PDS0702U12	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	U PDS	
	DATE COLLECTED:	7-02-96	
	MASS:	0.193	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.107	mg/M3
	AIR VOLUME:	1,800	Liters
	ANALYST:	Grace Borders	
8547217	WDS0702L2	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	WORKER DUST SAMPLE FROM DOZER	
	DATE COLLECTED:	7-02-96	
	MASS:	0.077	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.080	mg/M3
	AIR VOLUME:	960	Liters
	ANALYST:	Grace Borders	
8547218	WDS0702H2	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:		
	WORKER DUST SAMPLE FROM BACKHOE		

CONTINUED ON NEXT PAGE

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LOMBARD , IL
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PROJECT NAME/JOB ID: PO NO 04668 PAL
: DAVENPORT IOWA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	DATE COLLECTED:	7-02-96	
	MASS:	0.218	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.236	mg/M3
	AIR VOLUME:	922	Liters
	ANALYST:	Grace Borders	

NOTATIONS

The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

*** FINAL REPORT ***

BRYAN MASON
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REPORTED : 07/11/96
WORK ORDER: 125012

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT IA

AML NUMBER		VALUE	UNITS
8547842	PDS0703D13	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION: DOWNWIND PERIMETER DUST SAMPLE (DWPD)		
	MASS:	0.151	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.0740	mg/M3
	AIR VOLUME:	2040	Liters
	ANALYST:	R. Kenneth Petrie	
8547843	PDS0703U13	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION: UPWIND PERIMETER DUST SAMPLE (UWPD)		
	MASS:	0.717	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.355	mg/M3
	AIR VOLUME:	2020	Liters
	ANALYST:	R. Kenneth Petrie	
8547844	PDS0705D14	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DPDS	
	MASS:	0.120	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.0577	mg/M3
	AIR VOLUME:	2080	Liters
	ANALYST:	R. Kenneth Petrie	
8547845	PDS0705U14	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPDS	
	MASS:	0.342	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.168	mg/M3
	AIR VOLUME:	2040	Liters
	ANALYST:	R. Kenneth Petrie	
8547846	PDS0706D15	FILTER, AIR	

CONTINUED ON NEXT PAGE

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PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DPDS	
	MASS:	0.108	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.0587	mg/M3
	AIR VOLUME:	1840	Liters
	ANALYST:	R. Kenneth Petrie	
8547847	PDS0706U15	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPDS	
	MASS:	0.048	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.025	mg/M3
	AIR VOLUME:	1892	Liters
	ANALYST:	R. Kenneth Petrie	
8547848	PDS0708D16	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DPDS	
	MASS:	0.326	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.158	mg/M3
	AIR VOLUME:	2060	Liters
	ANALYST:	R. Kenneth Petrie	
8547849	PDS0708U16	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPDS	
	MASS:	1.85	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.910	mg/M3
	AIR VOLUME:	2032	Liters
	ANALYST:	R. Kenneth Petrie	
8547850	BLANK	BLANK	
1676	TOTAL WEIGHT		
STAT	MASS:	Less than Detection Limit.	
	CONTINUED ON NEXT PAGE		

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: DAVENPORT IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	DETECTION LIMIT:	0.010	mg
	ANALYST:	R. Kenneth Petrie	

NOTATIONS

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.

Dates of collection: 7/3/96- 7/9/96

*** FINAL REPORT ***

BRYAN MASON
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INDUSTRIAL HYGIENE DEPARTMENT

RECEIVED : 07/15/96
RELEASED : 07/16/96
REPORTED : 07/16/96
WORK ORDER: 125168

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT, IA

AML NUMBER		VALUE	UNITS
8548635	PDS0709D17	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE DOWNWIND	
	DATE COLLECTED:	7-9-96	
	MASS:	0.286	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.125	mg/M3
	AIR VOLUME:	2296	LITERS
	ANALYST:	Maria Marino	
8548636	PDS0709U17	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE UPWIND	
	DATE COLLECTED:	7-9-96	
	MASS:	0.460	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.208	mg/M3
	AIR VOLUME:	2208	LITERS
	ANALYST:	Maria Marino	
8548637	PDS0710D18	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE DOWNWIND	
	DATE COLLECTED:	7-10-96	
	MASS:	0.259	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.131	mg/M3
	AIR VOLUME:	1984	LITERS
	ANALYST:	Maria Marino	
8548638	PDS0710U18	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE UPWIND	
	DATE COLLECTED:	7-10-96	
	MASS:	0.047	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.023	mg/M3
	AIR VOLUME:	2044	LITERS
	ANALYST:	Maria Marino	

CONTINUED ON NEXT PAGE

ge and sex dependent reference ranges are printed when available

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INDUSTRIAL HYGIENE DEPARTMENT

X

RECEIVED : 07/15/96
RELEASED : 07/16/96
REPORTED : 07/16/96
WORK ORDER: 125168

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT, IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
8548639	WDS0710H3	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	WORKER DUST SAMPLE, BACKHOE	
	DATE COLLECTED:	7-10-96	
	MASS:	0.372	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.338	mg/M3
	AIR VOLUME:	1100	LITERS
	ANALYST:	Maria Marino	
8548640	WDS0710L3	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	WORKER DUST SAMPLE, VERSAR	
	DATE COLLECTED:	7-10-96	
	MASS:	0.024	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.14	mg/M3
	AIR VOLUME:	174	LITERS
	ANALYST:	Maria Marino	
8548641	PDS0711D19	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE DOWNWIND	
	DATE COLLECTED:	7-11-96	
	MASS:	0.308	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.257	mg/M3
	AIR VOLUME:	1200	LITERS
	ANALYST:	Maria Marino	
8548642	PDS0711U19	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	PERIMETER DUST SAMPLE UPWIND	
	DATE COLLECTED:	7-11-96	
	MASS:	0.483	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.216	mg/M3
	CONTINUED ON NEXT PAGE		

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7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT, IA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	AIR VOLUME:	2236	LITERS
	ANALYST:	Maria Marino	
8548643	WDS0711L4	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	WORKER DUST SAMPLE, VERSAR	
	DATE COLLECTED:	7-11-96	
	MASS:	0.181	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.539	mg/M3
	AIR VOLUME:	336	LITERS
	ANALYST:	Maria Marino	
8548644	BLANK	BLANK	
1676	TOTAL WEIGHT		
STAT	DATE COLLECTED:	7-11-96	
	MASS:	Less than Detection Limit.	
	DETECTION LIMIT:	0.010	mg
	ANALYST:	Maria Marino	

NOTATIONS

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.

*** FINAL REPORT ***

CONTINUED ON NEXT PAGE

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INDUSTRIAL HYGIENE DEPARTMENT

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RECEIVED : 07/15/96
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REPORTED : 07/16/96
WORK ORDER: 125168

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO #04668 PAL
: DAVENPORT, IA

AML NUMBER----------VALUE-----UNITS----------

CONTINUED FROM PRIOR PAGE

BRYAN MASON
DIRECTOR, IND. HYGIENE

FOR INDUSTRIAL HYGIENE RELATED QUESTIONS,
INCLUDING REQUESTS FOR SUPPLIES, CALL
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INDUSTRIAL HYGIENE DEPARTMENT

RECEIVED : 07/23/96
RELEASED : 07/24/96
REPORTED : 07/24/96
WORK ORDER: 125560

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO. 04668 PAL
: DAVENPORT

AML NUMBER			VALUE	UNITS
8550403	PDS0715D21		FILTER, AIR	
1676	TOTAL WEIGHT			
STAT	SITE/LOCATION:		DOWNWIND PERIMETER DUST SAMPLE	
	MASS:		0.115	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.0572	mg/M3
	AIR VOLUME:		2012	Liters
	ANALYST:		R. Kenneth Petrie	
8550404	PDS0715U21		FILTER, AIR	
1676	TOTAL WEIGHT			
STAT	SITE/LOCATION:		UPWIND PERIMETER DUST SAMPLE	
	MASS:		0.110	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.0565	mg/M3
	AIR VOLUME:		1948	Liters
	ANALYST:		R. Kenneth Petrie	
8550405	PDS0716D22		FILTER, AIR	
1676	TOTAL WEIGHT			
STAT	SITE/LOCATION:		DOWNWIND PERIMETER DUST SAMPLE	
	MASS:		0.201	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.0978	mg/M3
	AIR VOLUME:		2056	Liters
	ANALYST:		R. Kenneth Petrie	
8550406	PDS0716U22		FILTER, AIR	
1676	TOTAL WEIGHT			
STAT	SITE/LOCATION:		UPWIND PERIMETER DUST SAMPLE	
	MASS:		0.261	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.135	mg/M3
	AIR VOLUME:		1932	Liters
	ANALYST:		R. Kenneth Petrie	
8550407	PDS0718D23		FILTER, AIR	
1676	TOTAL WEIGHT			
STAT	SITE/LOCATION:		DOWNWIND PERIMETER DUST SAMPLE	

CONTINUED ON NEXT PAGE

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RECEIVED : 07/23/96
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WORK ORDER: 125560

7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO. 04668 PAL
: DAVENPORT

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	MASS:	0.788	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.315	mg/M3
	AIR VOLUME:	2500	Liters
	ANALYST:	R. Kenneth Petrie	
8550408	PDS0718DD23	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	MASS:	1.63	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.791	mg/M3
	AIR VOLUME:	2060	Liters
	ANALYST:	R. Kenneth Petrie	
8550409	PDS0718U23	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	MASS:	0.186	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.0969	mg/M3
	AIR VOLUME:	1920	Liters
	ANALYST:	R. Kenneth Petrie	
8550410	PDS0719U24	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	MASS:	0.387	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.174	mg/M3
	AIR VOLUME:	2220	Liters
	ANALYST:	R. Kenneth Petrie	
8550411	PDS0719U24	FILTER, AIR	
1676	TOTAL WEIGHT		
STAT	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	MASS:	0.334	mg
	DETECTION LIMIT:	0.010	mg

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7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO. 04668 PAL
: DAVENPORT

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	CONCENTRATION:	0.145	mg/M3
	AIR VOLUME:	2300	Liters
	ANALYST:	R. Kenneth Petrie	
8550412	BLANK	BLANK	
1676	TOTAL WEIGHT		
STAT	MASS:	Less than Detection Limit.	
	DETECTION LIMIT:	0.010	mg
	ANALYST:	R. Kenneth Petrie	

NOTATIONS

The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a respirable fraction sample.

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

*** FINAL REPORT ***

BRYAN MASON
DIRECTOR, IND. HYGIENE

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INDUSTRIAL HYGIENE DEPARTMENT

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REPORTED : 08/11/96
WORK ORDER: 126260

7965 VERSAR
ATTN: STEVE BUNSEN
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LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO.04668 PAL
: DAVENPORT, IOWA

AML NUMBER			VALUE	UNITS
8553822	PDS0722U25		FILTER, AIR	
1676	TOTAL WEIGHT			
	SITE/LOCATION:		UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:		7/22/96	
	MASS:		1.61	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.902	mg/M3
	AIR VOLUME:		1784	Liters
	ANALYST:		R. Kenneth Petrie	
8553823	PDS0722D25		FILTER, AIR	
1676	TOTAL WEIGHT			
	SITE/LOCATION:		DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:		7/22/96	
	MASS:		1.27	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.738	mg/M3
	AIR VOLUME:		1720	Liters
	ANALYST:		R. Kenneth Petrie	
8553824	PDS0723D26		FILTER, AIR	
1676	TOTAL WEIGHT			
	SITE/LOCATION:		DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:		7/23/96	
	MASS:		1.15	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.537	mg/M3
	AIR VOLUME:		2140	Liters
	ANALYST:		R. Kenneth Petrie	
8553825	PDS0723U26		FILTER, AIR	
1676	TOTAL WEIGHT			
	SITE/LOCATION:		UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:		7/23/96	
	MASS:		0.588	mg
	DETECTION LIMIT:		0.010	mg
	CONCENTRATION:		0.266	mg/M3
	AIR VOLUME:		2212	Liters
	ANALYST:		R. Kenneth Petrie	

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7965 VERSAR
ATTN: STEVE BUNSEN
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LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO.04668 PAL
: DAVENPORT, IOWA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
8553826	PDS0725U27	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/25/96	
	MASS:	1.96	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.838	mg/M3
	AIR VOLUME:	2340	Liters
	ANALYST:	R. Kenneth Petrie	
8553827	PDS0725D27	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/25/96	
	MASS:	1.18	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.522	mg/M3
	AIR VOLUME:	2260	Liters
	ANALYST:	R. Kenneth Petrie	
8553828	PDS0726D28	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/26/96	
	MASS:	1.12	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.675	mg/M3
	AIR VOLUME:	1660	Liters
	ANALYST:	R. Kenneth Petrie	
8553829	PDS0726U28	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/26/96	
	MASS:	Less than Detection Limit.	
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	Less than Detection Limit.	
	CONTINUED ON NEXT PAGE		

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7965 VERSAR
ATTN: STEVE BUNSEN
200 WEST 22ND STREET, STE. 250
LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO.04668 PAL
: DAVENPORT, IOWA

AML NUMBER		VALUE	UNITS
	CONTINUED FROM PRIOR PAGE		
	DETECTION LIMIT:	0.0058	mg/M3
	AIR VOLUME:	1740	Liters
	ANALYST:	R. Kenneth Petrie	
8553830	PDS0729U29	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	UPWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/29/96	
	MASS:	0.646	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.271	mg/M3
	AIR VOLUME:	2380	Liters
	ANALYST:	R. Kenneth Petrie	
8553831	PDS0729D29	FILTER, AIR	
1676	TOTAL WEIGHT		
	SITE/LOCATION:	DOWNWIND PERIMETER DUST SAMPLE	
	DATE COLLECTED:	7/29/96	
	MASS:	1.07	mg
	DETECTION LIMIT:	0.010	mg
	CONCENTRATION:	0.461	mg/M3
	AIR VOLUME:	2320	Liters
	ANALYST:	R. Kenneth Petrie	

NOTATIONS

The calculation of analyte concentrations is based on information (i.e. air volumes, exposure times, areas) provided by the client.

The analysis for Total Weight is performed by a gravimetric procedure using NIOSH method 0500.

Total weight refers to the total mass of particulate present on the filter, and is not compound specific. For particulate not otherwise classified (not covered by a specific standard or mentioned in the Z-1, Z-2 or Z-3 tables) the OSHA permissible exposure limit (PEL) expressed as an 8 hour time weighted average (TWA) is 15 mg/M3 for total dust and 5 mg/M3 for a

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LOMBARD , IL
60148

PROJECT NAME/JOB ID: PO NO.04668 PAL
: DAVENPORT, IOWA

AML NUMBER----------VALUE-----UNITS----------

CONTINUED FROM PRIOR PAGE
respirable fraction sample.

*** FINAL REPORT ***

BRYAN MASON
DIRECTOR, IND. HYGIENE

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IRA D. GODWIN, M.D.

APPENDIX F

POST CLOSURE INSPECTION FORMS
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

BERM INSPECTION FORM

PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

INSPECTION DATE: _____ INSPECTOR(S): _____

WEATHER CONDITIONS: _____

TYPE OF DISTRESS: (SETTLEMENT, DISTRESSED VEGETATION, DITCHES, EROSION, etc.)

1) _____

2) _____

3) _____

4) _____

5) _____

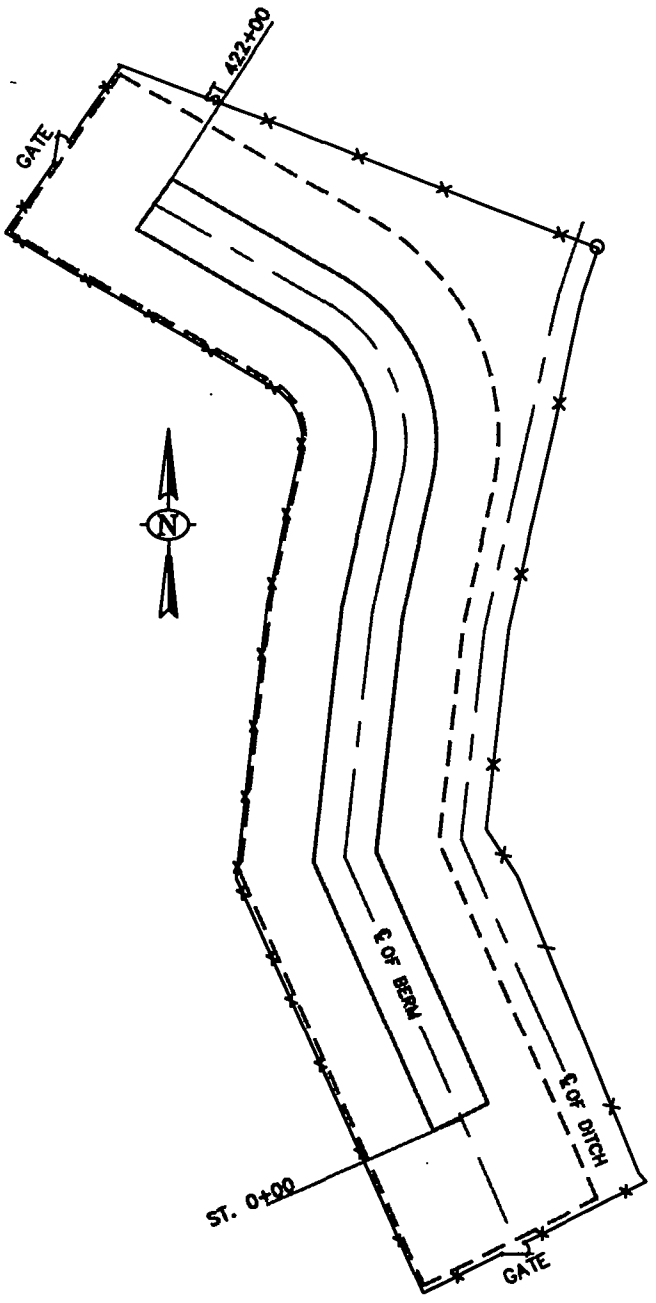
6) _____

7) _____

(ATTACH ADDITIONAL PAGE(S) AS NECESSARY.)

RESULTS REPORTED TO: _____

PAGE _____ OF _____



_____
INSPECTOR'S SIGNATURE

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BERM MAINTENANCE FORM

PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

MAINTENANCE: _____ INSPECTOR(S): _____

WEATHER CONDITIONS: _____

DESCRIPTION OF MAINTENANCE

1) _____

2) _____

3) _____

4) _____

5) _____

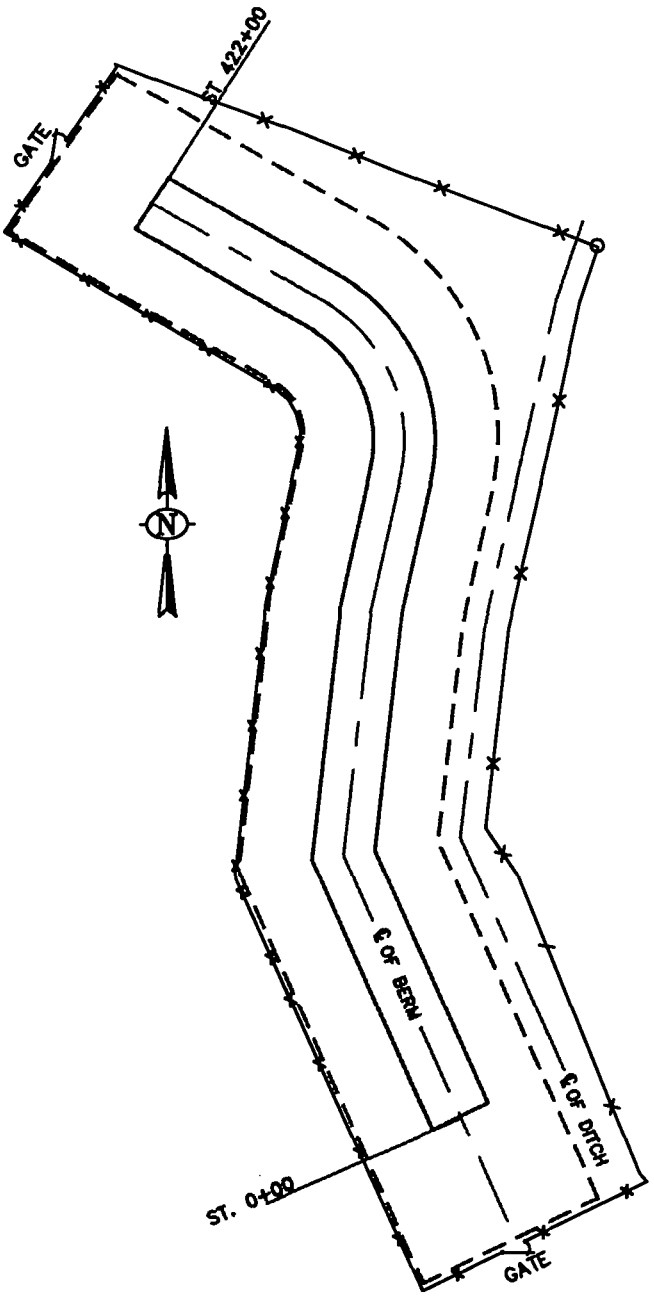
6) _____

7) _____

(ATTACH ADDITIONAL PAGE(S) AS NECESSARY.)

RESULTS REPORTED TO: _____

PAGE _____ OF _____



_____
INSPECTOR'S SIGNATURE

CAD G:\.....\D\2453005F5

BERM PHOTO LOG

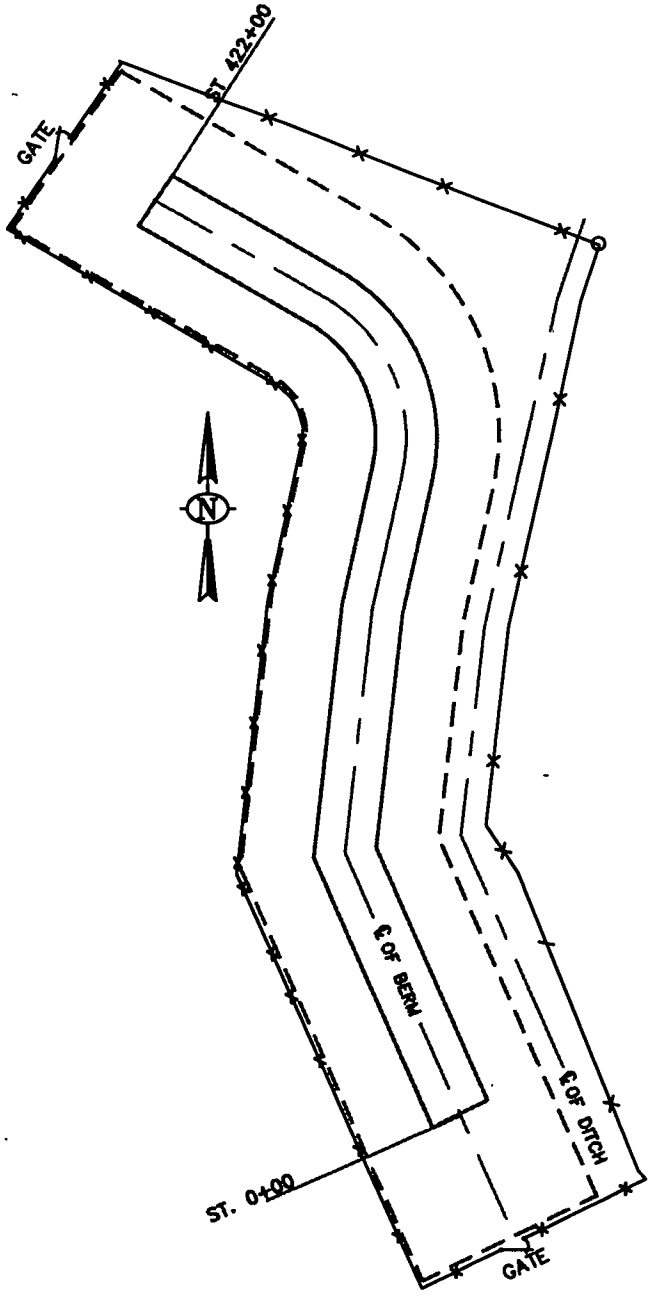
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

INSPECTION DATE: _____ INSPECTOR(S): _____

WEATHER CONDITIONS: _____

CAMERA/LENS: _____

PHOTO No. AND DESCRIPTON:



(ATTACH ADDITIONAL PAGE(S) AS NECESSARY.)

RESULTS REPORTED TO: _____

PAGE _____ OF _____

_____
INSPECTOR'S SIGNATURE

CAD G:\.....\D\2453005F2

YARD INSPECTION FORM

PACIFIC ACTIVITIES LIMITED, 626 SCHMIDT ROAD
DAVENPORT, IOWA

INSPECTION DATE: _____ **INSPECTOR(S):** _____

WEATHER CONDITIONS: _____

TYPE OF DISTRESS: (SETTLEMENT, DISTRESSED VEGETATION, DITCHES, EROSION, etc.)

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

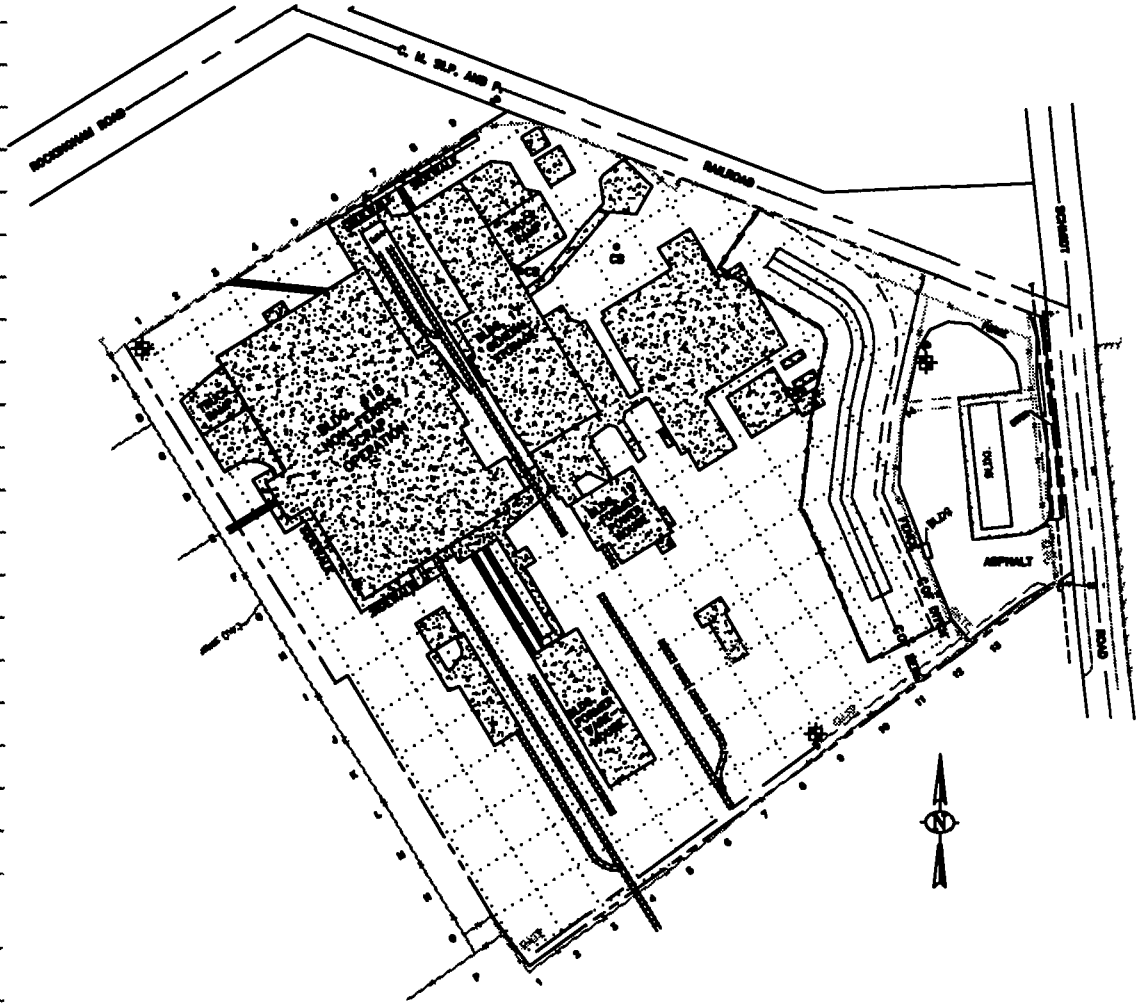
7) _____

(ATTACH ADDITIONAL PAGE(S) AS NECESSARY.)

RESULTS REPORTED TO: _____

PAGE _____ **OF** _____

_____
INSPECTOR'S SIGNATURE



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YARD MAINTENANCE FORM

PACIFIC ACTIVITIES LIMITED, 626 SCHMIDT ROAD
DAVENPORT, IOWA

INSPECTION DATE: _____ **INSPECTOR(S):** _____

WEATHER CONDITIONS: _____

DESCRIPTION OF MAINTENANCE

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

(ATTACH ADDITIONAL PAGE(S) AS NECESSARY.)

RESULTS REPORTED TO: _____

PAGE _____ **OF** _____

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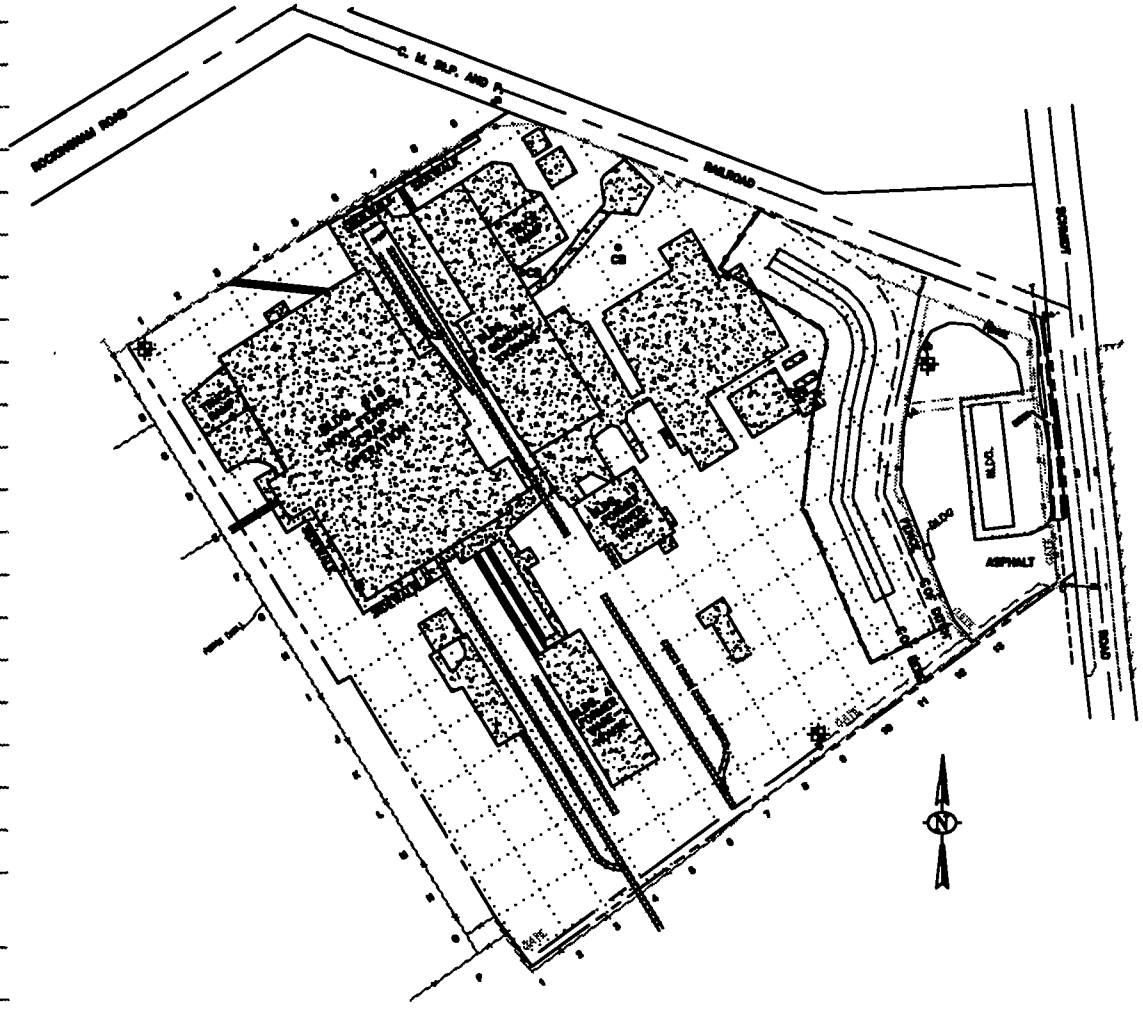
INSPECTOR'S SIGNATURE



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YARD INSPECTION/MAINTENANCE PHOTO LOG

PACIFIC ACTIVITIES LIMITED, 626 SCHMIDT ROAD
DAVENPORT, IOWA

INSPECTION DATE: _____ **INSPECTOR(S):** _____

WEATHER CONDITIONS: _____

CAMERA/LENS: _____

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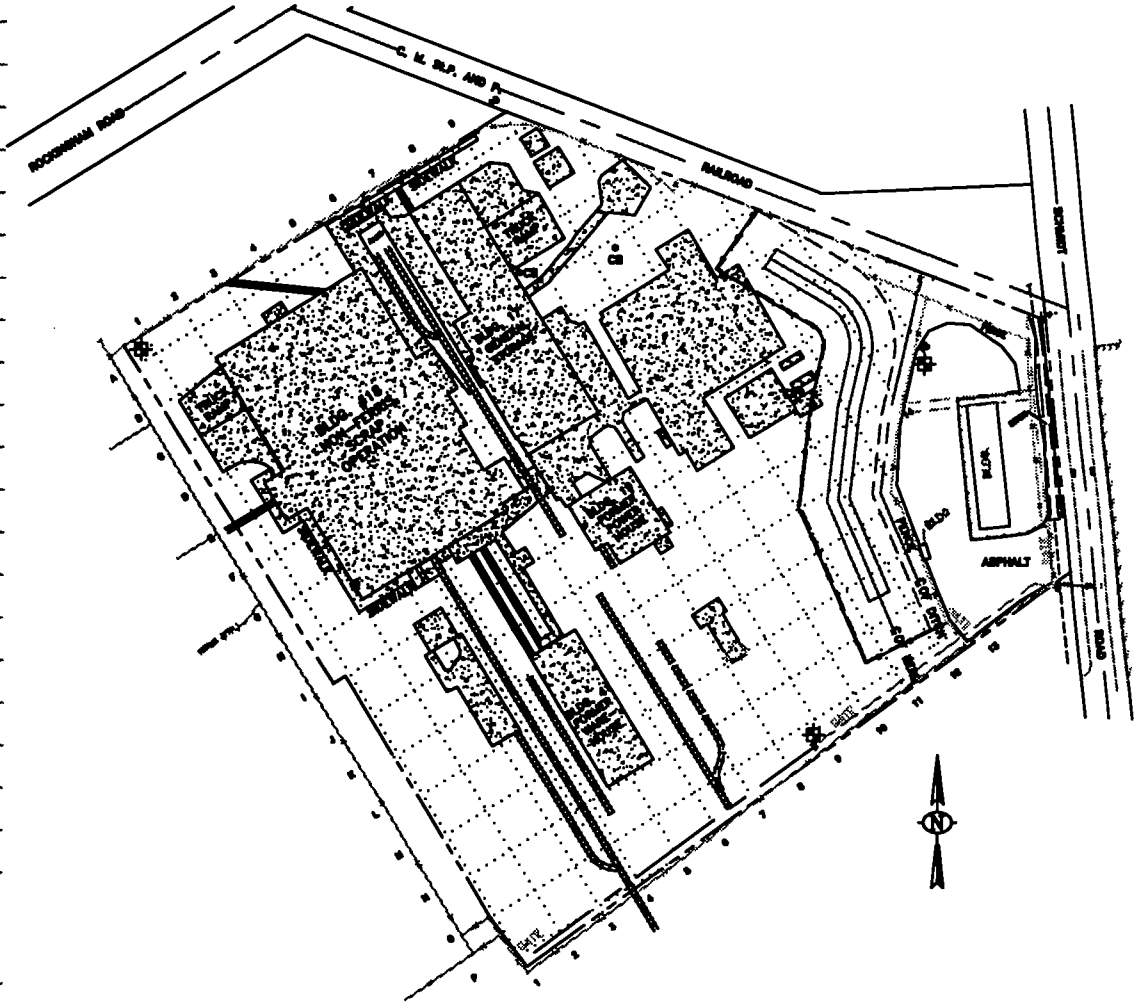

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INSPECTOR'S SIGNATURE

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APPENDIX G

CONSTRUCTION SPECIFICATIONS
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

PACIFIC ACTIVITIES LIMITED
REMEDIATION SERVICES

SECTION A6

SPECIFICATIONS

1.0 GENERAL

1.1 Related Documents

1.1.1 Work under this section is subject to the requirements of the Contract Documents, Specifications and Plans.

1.1.2 Removal Action Work Plan, prepared by Versar, May 1995.

1.1.3 References

The publications listed below form a part of this section to the extent referenced. The publications are referenced in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556 (1990)	Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 698 (1991)	Laboratory Compaction Characteristics of Soil Using Standard Effort (18,000 ft-lb/ft.)
ASTM D 2487 (1990)	Classification of Soils for Engineering Purposes
ASTM D 2922 (1991)	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Back Seatter Method Procedure A)

CODE OF FEDERAL REGULATIONS (CFR)

CFR 40 Part 262	Standards Applicable to Generators of Hazardous Waste
CFR 40 Part 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

1.2 Scope of Work

1.2.1 The scope of work will consist of providing necessary labor, material, tools, equipment and services for the stabilization of contaminated soils as shown on the Contract Drawings and as described in the Detailed Specification. The work is to include:

- Excavating, transporting, blending, and compacting contaminated soils
- Excavating, transporting, preparing, and placing battery casing fragments
- Supplying, transporting and compacting backfill soils, in accordance with applicable laws and regulations and to the complete satisfaction and acceptance of Pacific Activities Limited and Versar, Inc.
- Perform limited test section to determine compaction equipment performance during compaction of stabilized soils.

2.0 MOBILIZATION

2.1 Related Documents

2.1.1 Work under this section is subject to the requirements of the Contract Documents.

2.2 Scope of Work

2.2.1 Provide labor, material and equipment required for mobilization.

2.2.2 Mobilization shall consist of submittal of insurance for approval, permits, assignment of technical and safety personnel, and submittal of project schedule.

2.2.3 Mobilization shall include movement of equipment, material and labor to the site, including utility services.

2.2.4 Mobilization shall include location of surface and subsurface utilities.

2.3 Measurement

2.3.1 Mobilization will be measured as a lump sum basis, not to exceed fifteen (15) percent of overall bid.

2.4 Payment

2.4.1 Mobilization shall be considered complete and the lump sum prices specified be paid for work specified in Items 2.2 and when the following tasks have been completed in their entirety:

(a) Submittal and approval of insurance,

(b) Submit copies of all permits required to complete the work,

(c) Submit Contractor Quality Control Plan (CQC) and Assignment of technical and safety personnel,

(d) Submittal of project schedule,

(e) Any other items the contractor should be providing to the Pacific Activities Limited or Versar, Inc. (equipment, field office, phones, utility services, decon or laydown areas) as specified in the RFP.

3.0 SITE PREPARATION

3.1 Related Documents

3.1.1 Work under this section is subject to the requirements of the Contract Documents.

3.1.2 Section A-6 - General

3.2 Scope of Work

3.2.1 Provide labor, material and equipment required for preparation of the site.

3.2.2 Versar will provide Contractor with a surveyed 50-foot by 50-foot grid of property prior to mobilization following grid surveys will be the responsibility of the contractor. It will be the responsibility of contractor to maintain property grid during the course of the project.

3.2.3 Site preparation will consist of providing labor, equipment and material to remove and stockpile (onto existing concrete pads) large debris that will interfere with subsequent grading and excavation activities. Additional cleaning and grubbing shall be conducted, as necessary, to allow work to proceed uninterrupted by surface debris and vegetation.

3.2.4 Site preparation shall also include moving miscellaneous existing debris piles located throughout the work areas, as identified by the orange and red grids on Figure 1 to designated stockpile storage areas shown on the Drawing.

3.2.5 Preparation of subgrade to receive fill materials shall be compacted in accordance with criteria listed in Section A-6 Backfill 6.2.3

3.3 Measurement

3.3.1 Site preparation will be measured as a lump sum basis.

3.4 Payment

3.4.1 Site preparation shall be considered complete and the lump sum prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Removal and stockpiling of large debris that will interfere with subsequent grading and excavation activities onto existing concrete pads.

(b) Debris is segregated and stockpiled into separate piles of metal, wood, and miscellaneous debris and vegetation.

(c) Cleaning and grubbing necessary to allow work to proceed uninterrupted by surface debris.

(d) Moving of miscellaneous debris piles throughout the work areas, as identified by the orange and red grids in Figure 1.

4.0 EXCAVATION

4.1 Related Documents

4.1.1 Work under this section is subject to the requirements of the Contract Documents.

4.1.2 Work under this section is subject to the requirements of the Contract Documents USEPA Administrative Order or Consent, Docket No., VI-95-F-0008, included as Attachment 2.

4.2 Scope of Work

4.2.1 Contractor provide labor, material and equipment required to excavate and transport soil and/or black plastic/rubber casing fragments.

4.2.2 Excavate soil and black plastic/rubber casing fragment mix from the areas indicated on Figure 6 of the Work Plan. Excavation of the soil and casing fragment mix shall proceed until the distinct layer of casing fragments has been completely removed as determined by a Versar field engineer.

4.2.3 Excavate the upper minimum of twelve (12) inches plus a maximum of fourteen (14) inches of soil from gridded areas identified by red markings in Figure 1. Contractor shall verify depth of excavation below existing ground surface through the use of surveys. Surficial soil excavation shall not interfere with existing structures such as buildings, concrete pads, utility poles, railroad spurs, perimeter fences, and other features that are part of the property.

4.2.4 Soil and black plastic/rubber casing fragment mix and surficial soils from red grids will be stockpiled separately on existing concrete surfaces as shown on Figure 1 for inclusion with the solidification process.

4.2.5 The Contractor shall take necessary precautions to assure no damage occurs to existing structures, their appurtenances, monitoring wells, or utilities that may be effected by work activities. Available utility drawings will be provided to contractor prior to initiating excavation activities. The Contractor shall coordinate with Versar to locate underground utilities prior to beginning any excavation. Utilities encountered that were not previously shown or located shall not be disturbed without coordinating with Versar. Damage to structures or utilities resulting from Contractor operations shall be repaired by the Contractor at no expense to Versar or PAL.

4.3 Measurement

4.3.1 Excavation will be measured on a cubic yard basis. The contractor will survey and calculate excavation volume measured using double end area method. Volume calculations and survey data are to be provided to Versar for approval on a weekly basis.

4.4 Payment

4.4.1 Excavation shall be considered complete and the per cubic yard prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Excavation and transport of the upper one foot of surficial soil from the red grid areas is complete.

(b) Soil and soil/casing fragment mix stockpiled separately on the concrete slab in the former Melt Shop building area.

5.0 MATERIAL PRE-PROCESSING

5.1 Related Documents

5.1.1 Work under this section is subject to the requirements of the Contract Documents.

5.1.2 Section A6 - Excavation

5.1.3 Section A-6 - Soil Solidification

5.2 Scope of Work

5.2.1 Contractor shall provide labor, material and equipment required to shred and/or crush surficial soil and soil/casing fragments so that the mix shall pass through a 3/4-inch screen.

5.2.2 Stockpile screened soil on the concrete pad identified as former Melt Shop building area as shown on Figure 1.

5.3 Measurement

5.3.1 Pre-processing will be measured on a per-ton basis of material soil and casing fragments using calibrated discharge belt scale incidental to and included within the cost of soil solidification.

5.4 Payment

5.4.1 Pre-processing shall be considered complete and the per-ton prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Shredding of soil and the soil and black plastic/rubber casing fragment mix.

(b) Shredded soil and mix have been passed through the solidification process and compacted into the berm.

6.0 BACKFILL

6.1 Related Documents

6.1.1 Work under this section is subject to the requirements of the Contract Documents.

6.1.2 Section A-6 - Excavation

6.1.3 ASTM Standards

6.2 Scope of Work

6.2.1 Contractor shall provide labor, material and equipment required to regrade areas of red and orange grids (after excavation of red grids and casing fragments), place geotextile over regraded areas (Section A-6, Geotextiles), and backfill these areas with six inches of clean material and re-grade final surface to the original lines and grades of the site.

6.2.2 Backfill material will be obtained from an off-site borrow source and supplemented with on-site material deemed to be clean fill by laboratory testing, suitable for backfill, and approved by Versar prior to the start of work. Soil classification results shall be approved by Versar, Inc. prior to use on site. Backfill shall be classified in accordance with ASTM Specification D2487 as GM, GC, SW, and shall be free of roots, organic matter, trash, debris, snow, ice frozen clumps. Materials from landfills, such as refuse, debris from previous construction demolition, or material containing contaminated soil shall not be used as backfill. The backfill shall be compacted.

6.2.3 Excavations shall be backfilled by placing borrow fill in maximum of 6-inch loose lifts and compacting to 90 percent of the standard proctor maximum dry density as obtained in accordance with ASTM Specification D698. Density test results shall be provided to Versar for approval.

6.2.4 Compaction results shall be performed by an approved commercial testing laboratory as provided by the contractor. A minimum of one density test consisting of an average of three test locations shall be performed on every 2,000 square feet of lift. Compaction results shall be performed in accordance with ASTM Specifications D2922, D1556 and/or D2167.

6.2.5 Those areas which do not meet specified compaction criteria shall be excavated and recompacted, and tested to meet specified criteria. Compaction tests from recompacted area should be noted on the test form and include the failed test identification number.

6.3 Measurement

6.3.1 Geotextile will be measured as described in Section A-6, Geotextiles.

6.3.2 Backfill will be measured on a per-ton basis of material transported, placed, compacted and regraded in the areas where material has been excavated by the contractor.

6.4 Payment

6.4.1 Site preparation shall be considered complete and the per ton prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Excavation has been complete in accordance with Section A-6, Excavation.

(b) Borrow sources have been submitted to Versar prior to use on site.

(c) Excavated areas are regraded and backfilled to grade and compaction testing results are provided to Versar on the following work day.

(d) The site is regraded to the field engineer's satisfaction.

7.0 SOIL SOLIDIFICATION

7.1 Related Documents

7.1.1 Work under this section is subject to the requirements of the Contract Documents.

7.1.2 Work under this section is subject to the requirements of the Contract Documents USEPA Administrative Order or Consent, Docket No., VI-95-F-0008, included as Attachment 2.

7.1.3 The physical characteristics of the soil fragments, including treatability study results, particle size and concentrations are found in Attachment 3.

7.1.4 ASTM Standards.

7.2 Scope of Work

7.2.1 The Contractor shall provide a plan for stabilization of the contaminated soils to achieve the desired density requirements. The plan should address the type of equipment to be used, specifications and drawings of the unit, operational parameters and controls (e.g.; material control, throughput, etc.) specific to the type of soils and contaminants to be treated. The plan should also describe whether any soil shredding, pre-treatment of the soil will be necessary, and if so describe the equipment and process to be used. The plan should also address the type of controls to be used for dust air emissions.

7.2.2 Contractor provide labor, material and equipment required to excavate, transport and blend contaminated soils.

7.2.3 Material to be stabilized shall include the distinct layer of black plastic/rubber casing fragments that are excavated from the area identified on Figure 6 of the Work Plan. The casing fragments shall be equally distributed throughout the volume of stabilized material, and is estimated to be 16 percent of the stabilized material.

7.2.4 Soil and plastic fragments material to be stabilized shall be thoroughly mixed with nine percent cement by weight, one percent bentonite by weight, and optimum water content as defined in the laboratory analysis shown in Attachment 3 and placed in a berm. Laboratory treatability results are included as Attachment 3.

7.2.5 A single berm shall be located in the area designated on Figure 2 shall be constructed with a base width of 88 feet and have side slopes of no greater than 4:1. Berm cross sections are included in Figure 3.

7.2.6 Solidified material shall be placed into the berm in six-inch lifts and shall be compacted to a density of 104.7 pounds per cubic foot dry weight and an optimum moisture content of 18.3. In-situ density will be measured in accordance with ASTM-D2922. The testing frequency will include the average of three test locations every 1000 square feet of six-inch lift.

7.2.7 Material not meeting the designated density requirement shall be re-compacted until the material characteristics have been altered and prohibit the material to achieve the desired level of protection. The unsuitable material will be encased with a matrix of stabilized material at the contractor expense to ensure the specified density is obtained. Density tests for recompacted lifts shall be noted on the test form and include the failed test identification number.

7.2.8 Berm construction shall include drainage ditches, as depicted in Drawing _____.

7.3 Measurement

7.3.1 Soil Stabilization will be measured on a per-ton basis using calibrated discharge belt scale for soil that is screened, solidified, placed and to be compacted in a berm.

7.4 Payment

7.4.1 Soil Stabilization shall be considered complete and the per-ton prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Untreated material is processed to pass a 3/4-inch screen.

(b) Material is stabilized with the specified cement and bentonite, thoroughly mixed, and compacted into berm.

(b) Stabilized material has been compacted to the specified density, with reports provided to Versar no more than 24-hours after the time of the test.

8.0 UTILITY TRENCH

8.1 Related Documents

8.1.1 Work under this section is subject to the requirements of the Contract Documents.

8.1.2 Section A-6, Excavation.

8.2 Scope of Work

8.2.1 Contractor shall provide labor, material and equipment required to excavate two utility trenches on the north side of Buildings 17 and 18 as shown on Figure 4. Trench dimensions are four feet deep by five feet wide at the bottom.

8.2.2 Side slopes should be braced or sloped when necessary to maintain safe working conditions. Trench excavation shall be performed in accordance with local, state and OSHA regulations.

8.2.3 Soil excavated from the trenches may not be used as trench backfill. Material excavated from utility trenches shall be included with material stockpiled for stabilization. Backfill material shall be of a color and quality to allow future identification by others and shall be compacted to the same project density requirements. The backfill material shall be pre-approved by Versar.

8.3 Measurement

8.3.1 Utility trenches will be measured on a lineal foot basis of the trenches.

8.4 Payment

8.4.1 Utility trenches will be considered complete and the lineal foot prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Utility trenches have been excavated and backfilled with the surface restored to the original condition.

9.0 GEOTEXTILE

9.1 Related Documents

9.1.1 Work under this section is subject to the requirements of the Contract Documents.

9.1.2 Reference ASTM Standards for non-woven polypropylene geotextiles.

9.1.3 Section A-6 Backfill

9.2 Scope of Work

9.2.1 Specifications and samples for a 40-mil non-woven polypropylene geotextile (Amoco Nonwoven Waste Related Geotextile No. 4504 or equivalent) shall be submitted to Versar for approval. The contractor shall also furnish Versar, a mill certificate from the manufacturer stating the geotextile meets chemical, physical and manufacturing specifications stated in the manufacturers specification.

9.2.2 Contractor shall provide labor, material and equipment required to install and cover the referenced geotextile.

9.2.3 Contractor shall place non-woven geotextile fabric over grids identified by the red and orange markings in Figure 1. The fabric shall be placed after areas have been graded, in accordance with Section 6.0 Backfill above, to promote drainage in the direction indicated by the Site Engineer.

9.2.4 The fabric shall be secured in-place by pinning such that it will not be displaced while being covered with gravel. The area to receive the geotextile should be graded smooth free of obstructions, depressions, debris and soft, loose and/or saturated areas.

9.2.5 Seams shall be sewn with thread meeting the chemical requirements of the geotextile or bonded by cementing or heating. Seams shall be overlapped a minimum of three inches or in accordance with manufacturers specifications.

9.2.6 The fabric will be covered with a borrow soil as described in Section 6.0 Backfill.

9.3 Measurement

9.3.1 Geotextile placement will be measured on a square yard of fabric placed basis.

9.4 Payment

9.4.1 Site preparation shall be considered complete and the square yard prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Geotextile fabric is approved by Versar prior to use on site.

(b) Geotextile fabrics are installed and backfilled in accordance with Section 6.0, Backfill.

10.0 DRAINAGE/COVER SOIL

10.1 Related Documents

10.1.1 Work under this section is subject to the requirements of the Contract Documents.

10.2 Scope of Work

10.2.1 Upon completing construction of the solidified berm, contractor shall place a six-inch thick layer of drainage sand (ASTM classification SP-P, SP) with hydraulic conductivity of 10^{-4} cm/sec or higher) that is tied to the drainage ditches surrounding the berm.

10.2.2 The drainage layer shall be covered with an additional compacted six-inch thick layer of topsoil which shall be mulched and seeded. Topsoil shall be a loamy mixture having at least 10 percent passing a No. 10 sieve. The mixture shall be free of extraneous material and comply with the following requirements:

- Contain not less than one percent or more than ten percent organic matter.
- Shall contain not less than 12 percent or more than 50 percent clay.
- Sand content shall not exceed 55 percent.
- The pH of a portion of the material passing a No. 10 sieve shall not be lower than 5.0 nor higher than 8.0.
- Compaction shall be 85% Standard proctor density as determined by ASTM-D-698

10.3 Measurement

10.3.1 Drainage will be measured on a per-ton basis of drainage material and top soil placed as measured and ticketed by truck scales.

10.4 Payment

10.4.1 Drainage and Berm Cover shall be considered complete and the prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Solidified soils have been compacted into berm, and passing compaction tests are received by the site engineer.

(b) Drainage material and topsoil has been placed and approved by the site engineer.

11.0 CHAIN LINK FENCING

11.1 Related Documents

11.1.1 Work under this section is subject to the requirements of the Contract Documents.

11.2 Scope of Work

11.2.1 Contractor shall provide labor, material and equipment required for installation of a six-foot high chain-link fence surrounding the solidified berm, as shown in Figure 2.

11.2.2 Fence shall include posts, terminal posts, gate post, two 10 ft. gates horizontal braces, truss rods, fabric ties and fittings. Gates are located at approximately opposite ends of the berm. The gates shall contain a mechanism for applying a padlock.

11.2.3 Fence and gate posts shall be properly spaced and set in concrete.

11.3 Measurement

11.3.1 Fencing will be measured as a per lineal foot basis of installed fencing.

11.4 Payment

11.4.1 Fencing shall be considered complete and the lump sum prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Construction of the berm is complete and passing density tests have ben received by the site engineer.

(b) Fence installation is complete with gates and accepted by the site engineer.

12.0 SEEDING AND STRAW MULCH

12.1 Related Documents

12.1.1 Work under this section is subject to the requirements of the Contract Documents.

12.2 Scope of Work

12.2.1 Contractor shall provide labor, material and equipment required for seeding, fertilizing and mulching.

12.2.2 The area to be seeded shall be free of stones, boulders and debris and similar material greater than three inches in diameter. The area should be disked to a minimum of three inches with the largest soil particles not larger than one inch in largest diameter. The prepared surface should be free of weeds, clods, stones, roots, sticks, gullies, crusting and caking.

12.2.3 Seeds shall consist of a native grass mixture sown with a hydraulic seeder at rate of 1,000 gallons of slurry per acre. Fertilizer is to be applied by hydraulic seeder in second application.

12.2.4 Straw mulching should be performed within 24 hours of seeding. Mulch shall be applied either by hand or machine. The mulch should be loose enough to permit air circulation and compact enough to prevent erosion.

12.3 Measurement

12.3.1 Seeding and mulching will be measured as a square yard basis.

12.4 Payment

12.4.1 Seeding and mulching shall be considered complete and the square yard prices specified be paid for work specified and when seed, fertilizer and mulch have been applied.

13.0 DEMOBILIZE FROM SITE

13.1 Related Documents

13.1.1 Work under this section is subject to the requirements of the Contract Documents.

13.2 Scope of Work

13.2.1 Contractor shall provide labor, material and equipment required for demobilization.

13.2.2 Demobilization shall consist of removal of equipment, personnel and material from the site, and submitted to the file engineer logs, forms, and test results as specified in the RFP.

13.3 Measurement

13.3.1 Mobilization will be measured as a lump sum basis, not exceed the mobilization cost.

13.4 Payment

13.4.1 Mobilization shall be considered complete and the lump sum prices specified be paid for work specified and when the following tasks have been completed in their entirety:

(a) Submittal forms and logs as provided in the CQC Plan.

(b) Removal of equipment, unused material and personnel from the site.

APPENDIX H

GROUNDWATER SAMPLING PLAN
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA

Versar INC.

200 West 22nd Street, Suite 250, Lombard, IL 60148

GROUNDWATER SAMPLING PLAN
PACIFIC ACTIVITIES LIMITED
626 SCHMIDT ROAD
DAVENPORT, IOWA

Docket No. VII-95-F-0008

Prepared for:

Pacific Activities Limited
626 Schmidt Road
Davenport, Iowa

Versar Job No. 2453-005

November 1996

This document has been prepared in accordance with accepted scientific and engineering practices and procedures and Versar, Inc.'s Quality Assurance Program.

Prepared by: Dean Jones — 11/6/96
Dean Jones
Construction Manager
Date

Approved by: Michael B. Place — 11/6/96
Michael B. Place
Division Manager, Environmental Assessment Group
Date

TABLE OF CONTENTS

Attachments

1.0 INTRODUCTION

1.1 Project Objectives

The objective of the groundwater monitoring program is to provide chemical data over time at the Pacific Activities Limited site in Davenport, Iowa. The scope of the monitoring program will be sufficient to complete the following tasks:

1. Collect groundwater samples for chemical analysis.
2. Integrate the additional information collected at the site and present an evaluation of the nature of groundwater quality over time at the site. Data and accompanying technical discussions will be presented in report format quarterly.

1.2 Groundwater Sampling Plan

Objectives of this Groundwater Sampling Plan (GWSP) are to provide the technical requirements and reporting procedures for groundwater sampling to be conducted for this project. Target analytes are dissolved lead, nickel and cadmium.

1.3 Groundwater Wells

Three groundwater monitoring wells have been constructed at the site. Well locations are provided on the attached Monitoring Well Location Plan. Well Completion Reports have also been attached to the GWSP.

1.4 Monitoring Schedule

Groundwater monitoring will be conducted semiannually for five years. If, after five years of monitoring, no statistically significant increase in the target metals is observed in the groundwater, annual monitoring will be implemented for five years. If after a second five-year period, no statistically significant increase in the target metals is observed in the groundwater, the wells will be properly abandoned.

2.0 FIELD OPERATIONS

2.1 General

This section provides a detailed discussion of groundwater sample collection procedures for work performed under this sampling effort. Different types of sampling devices might be necessary to complete the sampling activities. The selection of a device will be based on applicability, compatibility with analytical considerations, safety, representativeness, practicability, and economics.

2.2 Site Reconnaissance, Preparation, and Restoration Procedures

Special site preparation requirements are expected to be minimal. In areas where unauthorized personnel or vehicle loading equipment may venture to close to sampling operations, hazard tape may be used to fence off work zones. Work zones for each site will be marked according to procedures described in the HASP.

2.3 Monitoring Well Sampling

Wells will be sampled from up gradient to down gradient across the site (based on groundwater flow). Groundwater flow at the site is to the south-southeast. The following procedures will be used for sampling monitoring wells.

1. Polyethylene sheeting will be placed around the base of the well being sampled to protect sampling equipment from contact with the soil.

2. Appropriate personal protective equipment (PPE), as outlined in the HASP will be worn during sampling. Additionally, samplers will put on clean sampling gloves between each well location.

3. Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.

4. Purging and sampling equipment (including pumps, tubing, bailers, cables, etc.) will be cleaned as specified in Section 2.5 and will be protected from possible contamination until ready for use.

5. Unlock the well cap at a particular site and stand back from the well for a few moments to allow groundwater levels to equilibrate.

6. Measure the static water level and the total sounded depth of the well with a calibrated tape or an electronic water level indicator and record in the field logbook. Note the time at which the measurement was taken. The tape will be cleaned between wells by rinsing with distilled water.

7. Calculate the borehole volume of water in the well (casing and filter pack) in gallons as follows:

$$V_t = (V_c + V_f)(7.48 \text{ gallons/ft}^3)$$

where:

$$V_c = \pi(d_i/2)^2(TD - H) \text{ and}$$
$$V_f = \pi P[((d_h/2)^2 - (d_o/2)^2)(TD - (S \text{ or } H))]$$

note: if S>H, use S; if S<H, use H

where:

V_c = volume of water in casing (ft^3)
V_f = volume of water in filter pack (ft^3)
V_t = total volume per "well volume" (ft^3)
d_i = inside diameter of casing (ft)
d_o = outside diameter of casing (ft)
d_h = diameter of the borehole (ft)
TD = total depth of the well (ft)
H = depth of water from the ground surface (ft)
S = depth to base of the bentonite seal from the ground surface (ft)
P = estimated porosity of filter pack (assume 0.30 (30%))

A typical well purge data sheet that will be used in the field to perform these calculations is attached with to this plan.

8. Purge the well by bailing with a stainless steel, PVC polyethylene or Teflon bailer and nylon rope or by mechanical pumping devices.

Purge water will be collected in a graduated container to monitor the quantity of water removed. Purge water will then be containerized and stored onsite, and properly labeled/identified pending analytical results to determine acceptable method of disposal. Once analytical data is received, disposal of the collected water will be done according to the following criteria:

- If concentrations of contaminants of concern are below applicable federally-established criteria for Drinking Water Standards (see below), the water will be discharged to the ground surface onsite.

- If concentrations of contaminants of concern exceed Drinking Water Standards criteria, the water will be disposed of according to applicable regulations.

Table 1 -Drinking Water Standards used to Determine Disposal Methods

Target Metal	Drinking Water Standard
Cadmium	Total Cd ≤ 0.005 mg/L
Lead	Total Pb ≤ 0.015 mg/L
Nickel	Total Ni ≤ 0.100 mg/L

9. Measure and record temperature, pH, and specific conductivity as each volume is purged. The measurements will be made from a grab sample representative of that volume.

   Purging will be considered complete when one of the following occurs:

   - At least three borehole volumes are removed and readings of pH, specific conductivity, and temperature have stabilized (pH within ±0.1 units, temperature within ±1°C, and specific conductivity variance within ±5%).
   - The well is pumped dry.
   - A maximum of six borehole volumes is removed.

10. After purging is complete, allow the well to recover to approximately 80% of its static water level or, for a well bailed or pumped dry, when a sufficient amount of water has recharged the well but within 24 hours of completing purging.

11. Groundwater samples may be collected according to the procedures listed in Item 8 (see above). The sample may be obtained using a bottom-emptying bailer or other mechanical device.

12. Samples will be field-filtered to 0.45 microns before retaining in the lab-provided container.

13. Sample containers will be prelabeled (before the trip to the well) or labeled in the field immediately after the sample is collected.

14. Place analytical samples on ice (storing at approximately 4°C in an insulated cooler). Samples will be shipped to the appropriate laboratory within 24 hours of collection, or when possible if collected on a weekend or holiday when overnight shipment is not possible. If samples must be held beyond 24 hours, they will be repacked with ice every 24 hours or sooner if the ice has melted. Section 5.0 contains sample packaging and shipping specifications.

15. Relock well the cap.

16. Complete field notebook, sample log sheets, custody seals, and chain of custody (COC) forms. Water sampling data will be recorded on a typical well purge form to record data collected during water sampling. Typical examples of forms to be used are attached to this plan.

17. Decontaminate purging and sampling equipment according to the procedures specified in Section 2.5.

2.4 Guidance for Field Quality Control Samples

The precision and accuracy of field sampling procedures will be checked through the preparation, collection, submission, and analysis of quality control (QC) samples. This section provides guidance for collecting those samples.

Matrix Spike/Matrix Spike Duplicate

One matrix spike/matrix spike duplicate pair will be collected and analyzed for every quarterly sampling event. Sample volumes required for analysis will be specified by the analytical laboratory.

2.5 Decontamination

The following procedure will be used to clean sampling devices that come in direct contact with samples, such as bailers and other in-situ sampling and testing equipment:

- Wash and scrub with alconox (or equivalent non-phosphate detergent) and potable water.
- Rinse with potable water.
- Air dry.
- Wrap in aluminum foil or protect with polyethylene sheeting (as appropriate) before use at the next sampling interval or location.

2.7 Handling and Disposal of Investigative-Derived Wastes

The following sections describe the handling and disposal procedures for waste material generated during this monitoring program.

Development/Purge Water and Decontamination Fluids

Purge water will be containerized pending analytical results. Based on the sample results, these liquids will be discharged to the ground surface, if the contaminants of concern are below applicable Drinking Water Standards. If contaminants are above Drinking Water Standards arrangements will be made for disposal off-site disposal according to local, state, and federal environmental regulations.

Personal Protective Equipment

PPE (such as disposable coveralls, gloves, respirator cartridges, tape, etc.) and disposable sampling equipment (such as disposable bailers, jars and containers, plastic sheeting, foil, disposable laboratory equipment, etc.) will be containerized and stored onsite pending arrangements for appropriate offsite disposal.

Labeling

Containers will be labeled with "NON-HAZARDOUS" labels containing the following information: contents (media), date generated, status (i.e., awaiting test results [i.e., labeled "ANALYSIS PENDING"], etc.), location of generation, and Versar point-of-contact name and phone number.

Storage

Containers will be closed and stored in a place designated by PAL. Containers will not remain on-site for more than 90 days before sampling collection. Containers will be stored in place designated by P.A.L.

Disposal

Versar will arrange for disposal of purge water according to local, state, and federal environmental regulations based on comparison of analytical results to the Drinking Water Standards or other criteria.

3.0 SAMPLE HANDLING AND ANALYSIS

3.1 Sample Custody

After collection, identification, and preservation, sample custody will be maintained by field personnel until sealing and securing of the shipping container or hand delivery to the analytical laboratory.

3.1.1 Field Custody Procedures

1. Pre-cleaned sampling equipment will be wrapped after decontamination and stored in a designated secure area until needed.

2. Sample bottles will be shipped from the laboratory to the site via commercial shuttle service or overnight mail. The bottles will be received by the field personnel and stored in a designated secure area until they are needed.

3. Samples will be collected as described in previous sections of this GWSP. Sample location and sample number will be recorded on the COC form. The sampler is responsible for the care and custody of the samples until they are properly transferred or dispatched.

3.1.2 Transfer of Custody and Shipment

Samples are accompanied by a COC form (see attached). When transferring samples, the individuals relinquishing and receiving will sign, date, and note the time on the COC. This documents sample custody transfer from the sampler, often through another person, to the laboratory. The COC is filled out as follows:

1. Enter header information (project number and name). For each station number, enter date, time, composite/grab, station location, number of containers, analytical parameters, and sample identification number (in remarks column). The laboratory should be notified if the sampler suspects that the sample contains any substance for which the laboratory personnel should take safety precautions.

2. Sign, date and enter the time under "Relinquished by" entry.

3. Make sure that the person receiving the sample signs the "Received by" entry, or enter the name of the carrier (e.g., UPS, Federal Express) under "Received by." The laboratory will sign "Received for Laboratory by" on the lower line and enter the date and time.

4. Enter the bill-of-lading or air bill number under "Remarks," if appropriate.

5. Place the original (top, signed copy) of the COC in the appropriate sample shipping package. Retain a copy with field records.

6. Sign and date two custody seals. These are an integral part of the custody process since they can provide an indication if samples have been tampered with during shipping.

7. Place the seals across the front and back of the shipping container such that they would be broken if the container is opened.

8. Complete the carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a single line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

Common carriers, if used, will usually not accept responsibility for handling COCs. This requires packing the record in the sample container (enclosed with other documentation in a plastic "zip-loc" bag). Since custody forms are sealed inside the sample container and the custody seals are intact, commercial carriers are not required to sign off on the custody form.

The laboratory representative who accepts the incoming sample shipment will sign and date the COC, completing the sample transfer process. It is then the laboratory's responsibility to maintain custody records throughout sample preparation and analysis.

3.2 Sample Packaging and Shipping

The objective of the sample packaging and shipping requirements are to maintain sample integrity from the time a sample is collected until it is received at the analytical laboratory. Specific procedures for packaging and shipping of environmental samples are presented below:

1. Prepare shipping containers (such as plastic or steel picnic coolers) for shipment.
   - Tape drain(s) shut.
   - Affix "This Side Up" labels on each cooler.
   - Place a mailing label with a laboratory address on top of cooler(s).
   - Assign COC forms and corresponding custody seals to respective coolers.
   - Place approximately one inch of packing material, such as asbestos-fee vermiculite, perlite, or Styrofoam beads, in the bottom of the cooler.

2. Prepare sample bottles.
   - Check to see that lids are on tight and that bottle labels are firmly affixed and labeled.
   - Remove gross contamination by wiping with a moist paper towel. Dry bottles.
   - Secure labels by wrapping clear tape around diameter of the bottle (and over the label).
3. Arrange the sample containers in front of their assigned coolers.
4. Seal each sample container in a separate "zip-loc" plastic bag. Squeeze as much air from the bottle as possible before sealing. Arrange the sample containers in the coolers.
5. Place ice directly on and around the sample containers.
6. Fill the remaining space with an inert, absorbent packing material such as vermiculite. Sufficient packing material should be used to prevent sample containers from breaking during shipment.
7. Person maintaining custody should sign the COC form and show the time and date it will be relinquished to the overnight carrier.
8. Seal the proper portions of the COC form in a "zip-loc" bag and tape it to the inside lid of the cooler.
9. Close the lid and latch the cooler.
10. Carefully peel the custody seals from their backings and place them intact over the front and back edges of the cooler.
11. Tape the cooler shut on both ends, making several complete revolutions with strapping (filament) tape (do not cover the custody seals).

4.0 FIELD MEASUREMENTS

4.1 General

This section presents a detailed description of procedures for field measurements to be taken during environmental sampling, including parameters, equipment calibration, equipment maintenance, and decontamination. For this investigation, field measurements include, but are not necessarily limited to: temperature, pH, specific conductivity, and water level.

4.2 Measurement Procedures

This section outlines the specific procedures to be followed when collecting measurement data using field equipment. These guidelines have been developed from manufacturers' operations manuals and standard industry practices. Sometimes, the procedures specified in this document may not apply precisely to the actual field equipment being used. Therefore, the manufacturer's instructions should be consulted first.

4.2.1 pH

The pH instrument should be calibrated according to manufactures instructions and the batteries should be checked before initiation of the field effort.

4.2.2 Specific Conductivity

The specific gravity instrument should be calibrated according to manufacturers instructions and the battery should be checked before use in the field.

4.2.3 Water Temperature

Water temperature may be measured with either a thermometer or temperature meter.

4.2.4 Water Levels

Water levels in each well will be measured according to the following procedures:

1. Check operation of electronic equipment above ground (many electronic water level indicators have a check button). Wear the proper PPE as specified by the HASP.

2. Record the following information on the water sampling field data sheet or in the field notebook if the form is not available.

   - Well number.
   - Top of inner well casing elevation and surface elevation (if available).
   - Well casing diameter.
   - Total depth of the well.
   - Date and time.
   - Any conditions that may affect measured water levels.

3. Water levels should be measured from the surveyed reference mark on the top edge of the inner well casing.

4. Record water level to the nearest 0.01-foot. If the well casing cap was airtight and there was an apparent pressure buildup within the casing, allow time after the cap is removed for equilibration of pressures after the cap is removed. Repeat measurements until the water level is stabilized.

5.0 FIELD QA/QC PROGRAM

The objective of the field quality assurance/quality controls (QA/QC) program is to ensure that field operations, sampling, and measurements produce results that:

- Specified data quality objectives are of known quality and in compliance.
- Results are traceable, technically accurate, legally defensible, and have definable characteristics.

Fundamental mechanisms for achieving established quality goals can be categorized as prevention, quality assessment, and correction and include the following:

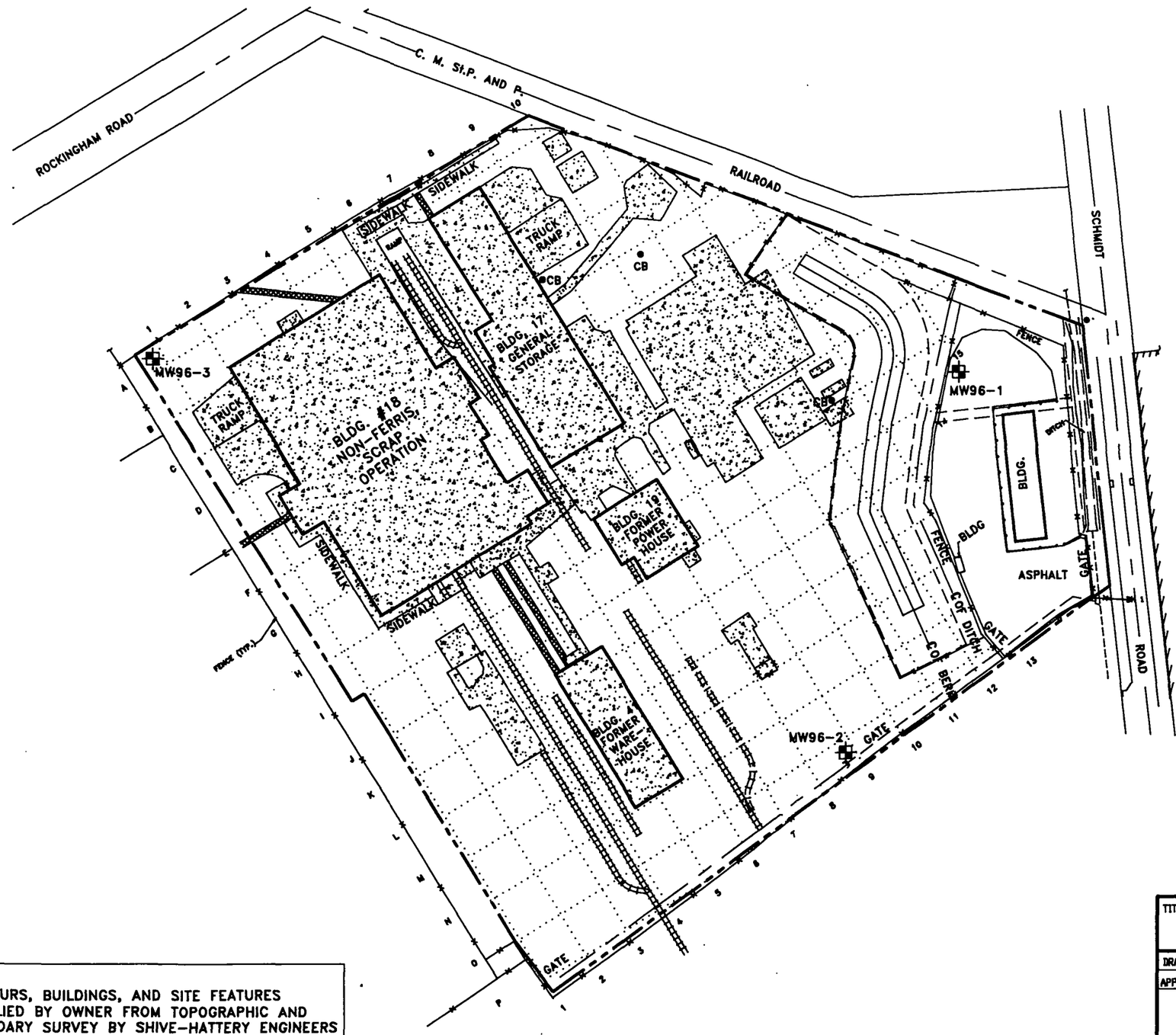
- Prevention of errors by planning and careful selection of methods, processes, and resources.
- Quality assessment through a program of audits and surveillance.
- Correction of processes to prevent recurrence of conditions averse to quality.
- Incorporation of new processes as they develop to increase quality.

The following items are controlled activities to ensure effective implementation of the field sampling program:

- Written and approved Standard Operating Procedures for field activities.
- Collection of field QC samples at the required frequency.
- Equipment calibrations according to the approved procedures and manufacturer's recommendation.
- Documentation and record keeping activities.
- Audits and surveillance activities and a corrective action program.

ATTACHMENTS

GROUNDWATER SAMPLING PLAN
PACIFIC ACTIVITIES LIMITED
DAVENPORT, IOWA



LEGEND

- UTILITY TRENCH
- PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF CATCH BASIN
- FENCE
- STORMWATER DRAINAGE DITCH
- UNDERGROUND STORMWATER PIPE
- CONCRETE AREA
- MONITORING WELL

APPROXIMATE SCALE

120' 0 120' 240'

NOTES:

1. CONTOURS, BUILDINGS, AND SITE FEATURES SUPPLIED BY OWNER FROM TOPOGRAPHIC AND BOUNDARY SURVEY BY SHIVE-HATTERY ENGINEERS PROJECT NO. 3933302-0

TITLE:

MONITORING WELL LOCATION PLAN

DRAWN: M.M.	DATE: 10-22-96
APPROVED: D.J.	SCALE: 1"=120'

Versar INC.
200 W. 22nd STREET, SUITE 250
LOMBARD, IL 60148

FOR:
PACIFIC ACTIVITIES LIMITED
826 SCHMIDT ROAD
DAVENPORT, IOWA

PROJECT NO. 2453005
DRAWING NO. 24535D4

Versar INC.

Well Completion Report

Site #: _____ County: SCOTT Well #: MW96-1

Site Name: P.A.L. Grid Coordinates: Northing _____ Easting _____

Drilling Contractor: GSI Date Drilled Start: 9-5-96

Driller: MAT WHITE Geologist: D. JONES Date Completed: 9-5-96

Drilling Method: 4.25-INCH ID HSAs Drilling Fluid (type): N/A

Annular Space Details

Type of Surface Seal: CONCRETE MIX

Type of Annular Sealant: BENTONITE CHIPS

Amount of Cement: # of bags _____ Lbs. per bag _____

Amount of Bentonite: # of bags _____ Lbs. per bag _____

Type of Bentonite Seal (Granular, Pellet) CHIP, HYDRATED DURING INSTALLATION

Amount of Bentonite: # of bags #1 Lbs. per bag 50.

Type of sand Pack: WELL PAC #2

Source of Sand: NORTHERN SAND & GRAVEL-SILICA

Amount of Sand: # of bags 5 Lbs. per bag 50

Well Construction Materials

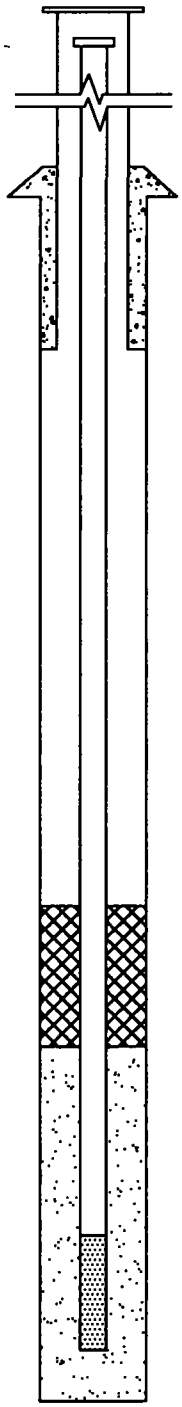
	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			SCH 40	
Riser pipe above w.t.			SCH 40	
Riser pipe below w.t.			N/A	
Screen			SCH 40	
Coupling joint screen to riser			SCH 40	
Protective casing				

Measurements

to 0.01ft. (where applicable)

Riser pipe length	7.3
Protective casing length	5'
Screen length	5'
Bottom of screen to end cap	.3'
Top of screen to first joint	.1
Total length of casing	12.3'
Screen slot size	0.01"
# of openings in screen	-
Diameter of borehole (in)	8"
ID of riser pipe (in)	2"

Elevations - .01 ft.



___ ___ MSL Top of Protective Casing

___ ___ MSL Top of Riser Pipe

___ ___ ft. Casing Stickup

___ ___ MSL Ground Surface

___ ___ MSL Top of Annular Sealant

1 . 5 ft. Top of Seal

1 . 5 ft. Total Seal Interval

3 . 0 ft. Top of Sand

4 . 2 ft. Top of Screen

5 . 0 ft. Total Screen Interval

9 . 2 ft. Bottom of Screen

9 . 5 ft. Bottom of Borehole

Completed by: DEAN JONES Surveyed by: _____ Ill. regestration #: _____

CAD FILE: G:\...\24535W1

Versar INC.

Well Completion Report

Site #: _____ County: SCOTT Well #: MW96-2

Site Name: P.A.L. Grid Coordinates: Northing _____ Easting _____

Drilling Contractor: GSI Date Drilled Start: 9-5-96

Driller: MAT WHITE Geologist: D. JONES Date Completed: 9-5-96

Drilling Method: 4.25-INCH ID HSAs Drilling Fluid (type): N/A

Annular Space Details

Type of Surface Seal: CONCRETE MIX

Type of Annular Sealant: BENTONITE CHIPS

Amount of Cement: # of bags _____ Lbs. per bag _____

Amount of Bentonite: # of bags _____ Lbs. per bag _____

Type of Bentonite Seal (Granular, Pellet) CHIP, HYDRATED DURING INSTALLATION

Amount of Bentonite: # of bags #1 Lbs. per bag 50.

Type of sand Pack: WELL PAC #2

Source of Sand: NORTHERN SAND & GRAVEL-SILICA

Amount of Sand: # of bags 5 Lbs. per bag 50

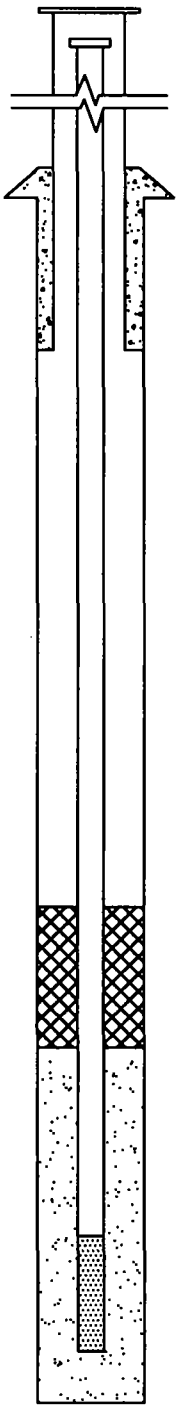
Well Construction Materials

	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			SCH 40	
Riser pipe above w.t.			SCH 40	
Riser pipe below w.t.			N/A	
Screen			SCH 40	
Coupling joint screen to riser			SCH 40	
Protective casing				

Measurements to 0.01ft. (where applicable)

Riser pipe length	6.4'
Protective casing length	5'
Screen length	5'
Bottom of screen to end cap	.3'
Top of screen to first joint	.1
Total length of casing	7.7'
Screen slot size	0.01"
# of openings in screen	-
Diameter of borehole (in)	8"
ID of riser pipe (in)	2"

Elevations - .01 ft.



___ ___ MSL Top of Protective Casing

___ ___ MSL Top of Riser Pipe

___ ___ ft. Casing Stickup

___ ___ MSL Ground Surface

___ ___ MSL Top of Annular Sealant

1 . 5 ft. Top of Seal

1 . 5 ft. Total Seal Interval

3 . 0 ft. Top of Sand

4 . 2 ft. Top of Screen

5 . 0 ft. Total Screen Interval

9 . 0 ft. Bottom of Screen

9 . 0 ft. Bottom of Borehole

Completed by: DEAN JONES Surveyed by: _____ Ill. regestration #: _____

CAD FILE: G:\...\24535W2

Versar INC.

Well Completion Report

Site #: _____ County: SCOTT Well #: MW96-3

Site Name: P.A.L. Grid Coordinates: Northing _____ Easting _____

Drilling Contractor: GSI Date Drilled Start: 9-5-96

Driller: MAT WHITE Geologist: D. JONES Date Completed: 9-5-96

Drilling Method: 4.25-INCH ID HSAs Drilling Fluid (type): N/A

Annular Space Details

Type of Surface Seal: CONCRETE MIX

Type of Annular Sealant: BENTONITE CHIPS

Amount of Cement: # of bags _____ Lbs. per bag _____

Amount of Bentonite: # of bags _____ Lbs. per bag _____

Type of Bentonite Seal (Granular, Pellet) CHIP, HYDRATED DURING INSTALLATION

Amount of Bentonite: # of bags #1 Lbs. per bag 50.

Type of sand Pack: WELL PAC #2

Source of Sand: NORTHERN SAND & GRAVEL-SILICA

Amount of Sand: # of bags 5 Lbs. per bag 50

Well Construction Materials

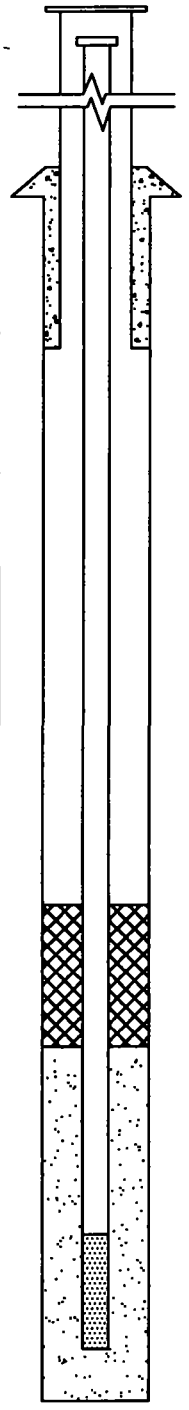
	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			SCH 40	
Riser pipe above w.t.			SCH 40	
Riser pipe below w.t.			N/A	
Screen			SCH 40	
Coupling joint screen to riser			SCH 40	
Protective casing				

Measurements

to 0.01ft. (where applicable)

Riser pipe length	6.2'
Protective casing length	5'
Screen length	2.5'
Bottom of screen to end cap	.1'
Top of screen to first joint	.1
Total length of casing	8.7'
Screen slot size	0.01"
# of openings in screen	–
Diameter of borehole (in)	8"
ID of riser pipe (in)	2"

Elevations - .01 ft.



_____ _____ MSL Top of Protective Casing

_____ _____ MSL Top of Riser Pipe

_____ _____ ft. Casing Stickup

_____ _____ MSL Ground Surface

_____ _____ MSL Top of Annular Sealant

1 . 5 ft. Top of Seal

1 . 0 ft. Total Seal Interval

2 . 5 ft. Top of Sand

3 . 4 ft. Top of Screen

2 . 6 ft. Total Screen Interval

6 . 0 ft. Bottom of Screen

6 . 0 ft. Bottom of Borehole

Completed by: DEAN JONES Surveyed by: _____ Ill. regestration #: _____

CAD FILE: G:\...\24535W3

Versar INC.

GROUNDWATER SAMPLING AND WELL DEVELOPMENT LOG

Project _____ Date _____

Project Number _____ Well Number _____

Initial Water Level (ft TOIC) _____ Time _____

Total Depth of Well (ft TOIC) _____ One Well Volume (gallons) _____

Field Personnel _____

Development _____

WITHDRAWAL OF WELL VOLUMES

Time					
Volume Purged (gallons)					
Temperature (°C)					
Conductivity (umhos)					
pH					
Odor					
Turbidity					
Color					
Other					
Time					
Volume Purged (gallons)					
Temperature (°C)					
Conductivity (umhos)					
pH					
Odor					
Turbidity					
Color					
Other					

To calculate well volume:

Inner Diameter of Well Casing (ft) = D_1 _____ Outer Diameter of Well Casing (ft) = D_2 _____

Borehole Diameter (ft) = D_3 _____ Total Depth of Well (ft) _____

Height of Water Column in Well (ft) = H_1 _____ Length of Saturated Filter Pack (ft) = H_2 _____

Filter Pack Porosity = N assume 0.30

One Well Volume = $7.48\ gal/ft^3 \times [(\pi(D_1/2)^2 H_1) + (N\pi H_2((D_3/2)^2 - (D_2/2)^2))]$

Notes:

Versar INC.

CHAIN OF CUSTODY RECORD

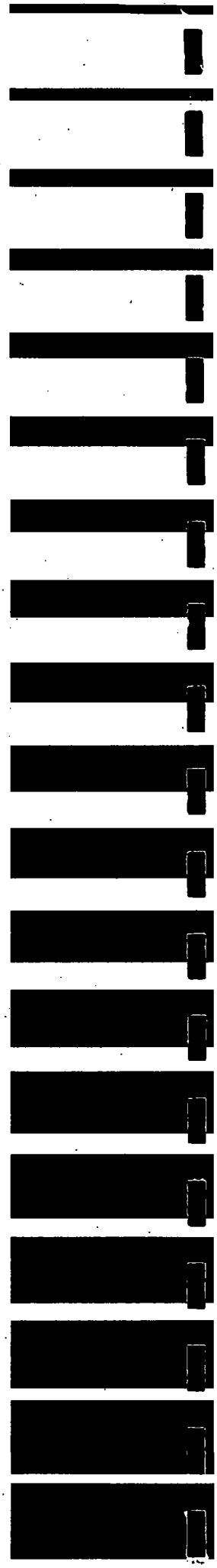
PROJECT NO.	PROJECT NAME	PARAMETERS	INDUSTRIAL HYGIENE SAMPLE Y / N
SAMPLERS: *(Signature)*	(Printed)		

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS									REMARKS

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
(Printed)		(Printed)	(Printed)		(Printed)

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
(Printed)		(Printed)		

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).



Versar INC.
MIDWEST REGIONAL OFFICE
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